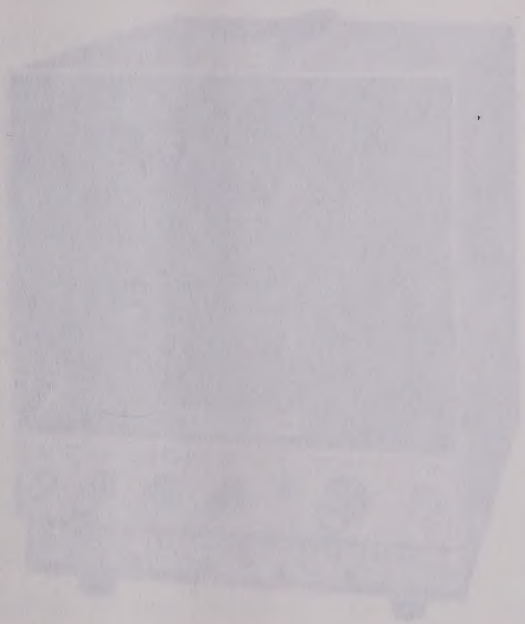
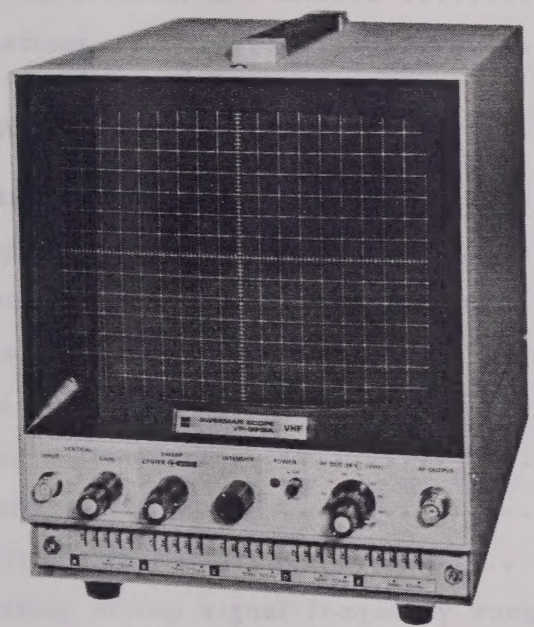
MANUAL PART NO.
MEP8915A-0



SWEEMAR SCOPE

VP-8915A



VP-8915A VHF Band

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C O N T E N T S

Section 1. CHECKING FOR PROPER LINE VOLTAGE AND PROTECTING ATTENUATOR

AC power supply

The Sweemar Scope in this series is designed to operate on a 100 V, 115 V, 215 V, or a 230 V AC power supply depending on position of line voltage selector.

The voltage range indicated by the arrow of the line voltage selector plug located on the rear panel of this unit is the operating voltage. Prior to use, make certain this indication matches the line voltage.

Protecting attenuator

The attenuator circuit used in the units of this series is electronic, and compared to the older units, is much easier to handle, however, an external voltage applied to the output cable terminal may destroy the attenuator circuit. Be particularly careful not to let any voltage potential contact with this terminal.

Section 2. GENERAL

2.1 General description and features

The Sweemar Scope VP-8911A series has combined the sweep signal generator, monitor scope, and the variable marker circuit into one cabinet, and as a sweep signal generator, possesses a number of new functions.

One of the shortcomings found in the previous sweep signal generators has been the difficulty in changing the marker frequency. This has been solved by use of the digital - type variable marker circuit. The digital switch located under the front panel may be changed in steps of 1 kHz in the LW-MW and the SW band, and in 10 kHz steps in the FM and the VHF band. This alows the user to freely make the desired marker frequency settings and readings,while the accuracy and stability of the crystal resonator type marker is maintained. Consequently, maintenance for marker frequency change is not necessary, effectively increasing the in-use time of the equipment.

Also, the 9-inch, large screen monitor included in one cabinet has made a smaller and more lightly constructed unit available than conventional "genescopes". The cables required to this Sweemar Scope are only two, one from sweep signal output and the other for detected signal from the device being measured, making the reshuffle of the equipment due to changes in the production line more simple. The units may also be used effectively on the workbench.

Other features include a sweep signal output (RF signal) of 100 mVrms, built-in 80 dB electronic attenuator which may also be remotely controlled, and the accuracy of the tracking adjustment has been increased by slowing down the sweep rate only in the areas close to the marker frequencies.

Section 2. GENERAL

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Also, the 5-inch, large screen monitor included in one cabinet has made a smaller and more lightly constructed unit available than conventional "panascope". The cables required to this Sweepmar Scope are only two, one from sweep signal output and the other for detected signal from the device being measured, making the readability of the equipment due to changes in the production line more simple. The units may also be used effectively on the workbench.

Other features include a sweep signal output (RF signal) of 100 mVrms, built-in 80 dB electronic attenuator which may also be remotely controlled, and the accuracy of the tracking adjustment has been increased by slowing down the sweep rate only in the areas close to the marker frequencies.

Such new functions make this sweep signal generator with monitor valuable for assembly of radios, filters, and other components.

Features:

[1] Built-in digital-type variable marker generator circuit.

[2] High-precision, highly stable marker.

[3] Marker circuit covering a wide range of frequency.

[4] High-precision tracking measurement.

[5] Built-in electronic-type attenuator which may be controlled remotely.

[6] Combined monitorscope.

[7] A series covering all radio frequency bands.

2.2 Specifications

	VP-8915A
Sweep frequency	
Frequency range	10 —— 225 MHz
Center frequency range	12.5 — 222.5 MHz
Sweep width	5 —— 215 MHz
Band selector	
Sweep output	
Output voltage	100dB (0.1Vrms) into 50Ω band
Output impedance	50Ω
Attenuator	10dB steps, 7 ranges 0 to 10dB continuously variable
Marker section	
Frequency	Any frequency within the sweep range
Setting	5 digit digital switch
Minimum interval	
Frequency accuracy	±0.05%
Number of markers	5 points simultaneous
Marker type	Intensity modulation
Monitor section	
Sweep repetition rate	LINE FREQ. X1/2, 1/3.1/4, 1/5
Sweep waveform	Sawtooth wave
Duty cycle	Approx. 1 : 19 (at LINE FREQ. X 1/2)
Vertical axis sensititivy	10mV/DIV. variable
Vertical axis frequency range	DC ~ 5 kHz (5 DIV.)
Vertical axis input impedance	Approx. 500 kΩ
Horizontal axis amplitude	Over 17 DIV. (Fixed)
CRT	9-inch, 90° electro-magnetic deflection cathode-ray tube
Power supply	
Voltage	100V, 115V, 215V, 230V each ±10%
Frequency	50Hz/60Hz
Power consumption	less than 45 VA

Dimensions/Weights	
Height	260mm
Width	225mm
Depth	310mm
Weight	Less than 8 kg
Accessories	Hood 1
	Fuse 1
	Instruction manual 1
	AF cable (red) 1
	AF cable (black) 1

Section 3. OPERATING INSTRUCTIONS

3.1 Installation

Prior to permanently installing the Sweemar Scope on the workbench, the following items should be noted.

A location should be selected where reflections from the lighting in the area will not make the CRT display hard to watch. The accessory hood may be used to eliminate most reflections. (Refer to Section 3., Item 3.5). The stand attached to the bottom plate may also be used to make the CRT easier to see.

3.2 Checking the power supply

Prior to performing the operational check, make certain the AC power supply voltage to the workbench is matched with the main power supply setting of the unit and that the rating of the fuse is correct.

3.2.1 Setting main power supply voltage

The Sweemar Scope series is designed to be operated with power supply voltages of 100 V, 115 V, 215 V, or 230 V by changing the connection of line voltage selector located on the rear panel. The voltage the unit has been set at is indicated by the arrow located in the LINE VOLTAGE indicator plate on the rear panel. If it does not agree with the line voltage to be used, it should be set using the following procedures.

1. Remove the LINE VOLTAGE indicator plate from the rear panel of the unit.
2. Pull out the plug with the arrow on it, turn it to the correct voltage indication and re-insert it.

3. Make certain the LINE VOLTAGE plate is tightened down before using the unit.

3.2.2 Main power supply fuse rating

A fuse is built into the fuse holder fixed to the rear panel, to which the main power supply cord is connected.

When changing the voltage of the main power supply, or using the equipment for the first time, always make certain the power supply voltage and the fuse rating is correct.

Main power supply voltage	Fuse rating	Fuse designation
100 - 115V	1 ampere	125V, 1A
215 - 230V	0.5 ampere	250V, 0.5A

3.3 Controls and Connectors

A front and rear panel diagram is included in the folding pages located at the back of this manual. The numbers used in the explanation that follows correspond to the numbers of the controls and connectors in the diagram and should be referred to while the nomenclature and operating procedure is explained in this section.

Front panel

① RF OUTPUT ..... Sweep signal output terminal. An output voltage of 100 mVrms (50Ω load termination) may be obtained with all models of the series.

② ATT dB ..... 10 dB step attenuator. Turning this control counterclockwise provides 70 dB of attenuation. Since it is an electronic type attenuator, remote control of

attenuation is possible by removing the switch and level controller from front panel and using an extension cord.

③ LEVEL ..... Dual shaft consisting of the 10 dB continuously variable attenuator and the step attenuator. The inner shaft is the 10 dB continuously variable attenuator, and the outer shaft is the step attenuator. Turning the control clockwise reduces the attenuation and increases the level.

④ SWEEP —CENTER ..... This control adjusts the center frequency of the sweep signal oscillation. Turning the control clockwise increases the frequency.

⑤ SWEEP —WIDTH ..... This control is used to adjust the sweep frequency range of the sweep signal oscillation. Turning the control clockwise makes the sweep width wider and the space between the markers more narrow.

⑥ INTENSITY ..... This control adjusts the intensity of the brightness on the monitor. Turning the control clockwise increases the intensity.

⑦-A SWEEP TIME ..... A screw-driver adjustment for setting the sweep repetition rate. The normal repetition rate (1/2 the power line frequency) is obtained at its fully clockwise position. Counterclockwise rotation of the adjustment will decrease the repetition rate up to at least 1/5 the line frequency.

⑦ -B SWEEP MAG ..... A screw-driver adjustment to vary the partial sweep speed, consequently the horizontal magnification factor on monitor screen partially at the portion of each marker.
The maximum magnification (the slowest sweep speed - 1 msec for each portion) is obtained at its fully clockwise position.

⑧ (Power pilot) ..... This lamp lights when the power is ON

⑨ POWER ..... When the power switch is in the ▬ position, the power is ON, in the ▮ position, the power is OFF. The power is OFF when the shaft is popped out.
ON/OFF

⑩ GAIN ..... This is the gain control for the vertical axis. Turning the control all the way to clockwise brings it to a calibrated sensitivity of 10 mV/DIV. Counter-clockwise (CCW) rotation lessens the sensitivity, and if turned completely CCW, over 40 dB of attenuation is obtained.

⑪ ◀ ..... This is the vertical position control for the monitor. Turning the control clock-wise moves the trace toward the top of the screen.

⑫ V. INPUT ..... This is the input terminal to the vertical axis of the monitor. Because of its high input impedance, approximately 500 kΩ, it affects the device being measured very little.

⑬ (Digital switch) ... This switch is used for setting the marker frequency in the variable type marker circuit. Provided on all units except the VP-8911A IF Sweemarscope, the details and operating procedure may be described in Item 3.4 of this manual.

Rear panel

⑭ (Power cord) ..... This is the main power cord and is fitted with a 3-prong grounded plug.

⑮ FUSE ..... This is the primary-side fuse. The rating of the fuse used should be in accordance with the main power voltage.

⑯ (Ground terminal).. The ground terminal provided on the cabinet should always be connected to ground for safety.

⑰ LINE ..... This plug and socket type device is used
VOLTAGE selector to convert the voltage of power transformer primary winding of the unit to make it operate from a deferent voltage. The plate is fixed on by two screws, and the voltage indicated by the arrow is the voltage the unit is presently set to operate at.

3.4 Operating procedure

3.4.1 General operations

(1) Prior to turning on the power switch, set all the controls to the positions indicated below.

Front panel	Controls	Position
	ATT dB	100 dB
	LEVEL	CAL
	SWEEP CENTER	Center
	SWEEP WIDTH	Fully clockwise (CW)
	INTENSITY	Fully counterclockwise (CCW)
	GAIN	Anywhere
	⫞	Center
Rear panel	LINE VOLTAGE	Set to line voltage

(2) Press the POWER ON.OFF switch.

(3) Watching the CRT screen, adjust the INTENSITY to a level easy to see. Since the horizontal axis is connected internally in the unit, no horizontal position or horizontal gain adjustments will be necessary. The vertical position is adjusted by turning the control with a ⫞ mark on it. Set it to the proper position.

3.4.2 Setting marker frequency

(1) The marker frequency is pre-set internally in model VP-8911A IF Sweemar Scope and needs no further attention. Whereas on the other models, the setting is made using the digital switches located under the front panel.

(2) The digital switches are divided into five divisions by every 5 digits with each division being indicated with the letters A, B, C, D, and E from the left respectively, and the frequency units are noted with the marks MHz or kHz.

(3) When setting the marker frequency, always start with the lowest value in the A division, assigning the lowest marker frequency in this division. Then working toward the right, gradually set the frequency to a higher setting.

(4) Since the digital switch has no locking mechanism, it may be set on any value from 0 to 9, however, it should be set within the sweep frequency range for each of the A, B, C, D, or E divisions. When set outside this range, the marker will fail to appear or it could result in an error in the operations. When this happens, returning the digital switch back to a value within the sweep frequency range will restore normal operations.

(5) Some of the errors that may occur due to a faulty frequency setting are;

(a) The digital switch being set to a value lower than the sweep frequency range will result in the marker being at the left edge of the trace. A correct value will not be indicated in this case.

(b) The digital switch being set to a value higher than the sweep frequency range will result in the marker disappearing off the right hand side of the screen.

(c) If the digital switches in both A and B divisions are set to the same value, the two markers will not overlap, but appear apart with a fixed space between them. When the A division digital switch is gradually set higher, the B marker will move to the right as if it were being pushed. Naturally this will result in an error.

(6) When the markers have a fixed space between them, the digital switch of the lowest frequency marker must be set to the far left position and digital switches of higher frequencies must be set toward the right as noted in(3) above in order to restore normal operations.

(7) The marker to marker space cannot be set smaller than a certain value due to circuit design. This smallest marker to marker space is also relative to the sweep frequency range, and is obtained as a value of (sweep signal frequency range)/40.

(8) If sweep width of RF signal is more than five times the lowest set marker frequency, markers may flicker. In this case operation can be restored to normal by making the sweep width narrower with the SWEEP WIDTH control.

3.4.3 Setting sweep signal frequency range

(1) Starting from the left side A of the digital switch and working toward the right, increase the setting values in order of A, B, C, D, and E.

(2) When these 5 point markers are all set and displayed on the screen, adjust the SWEEP CENTER and the WIDTH controls located on the front panel.

(3) This completes the setting of the sweep signal frequency.

3.4.4 SWEEP TIME and SWEEP MAG Operating Procedure

a. SWEEP TIME

(1) When the sweep signal generator is used for tracking or covering adjustment, or filter characteristic measurement high repetition frequencies (short sweep time) may cause

measured waveforms to appear somewhat higher, thus impeding accurate measurement. To solve this problem, reduce the sweep signal frequency variation per unit time by narrowing the sweep width or by prolonging the sweep time during which the sweep signal generator is driven.

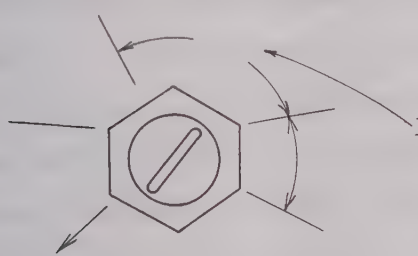
(2) The SWEEP TIME control varies the sweep repetition frequency (sweep time) as follows:

Rotated fully clockwise (↻) .... Line frequency x 1/2

Rotated fully counterclockwise (↺) .... Line frequency x 1/5 or less

(3) The repetition frequency should be determined to be as high as possible, but within the range in which no error occurs, depending on the measured waveform. Too low a repetition frequency causes the display to flicker the display, which may cause the operator's eyes some discomfort.

(4) The SWEEP TIME control should be set between switching points; otherwise the repetition frequency may vary because of various fluctuations.



b. SWEEP MAG

(1) In measurement of high-Q (steep characteristic curve) devices such as filters or tuners, increasing the sweep time with the other conditions unchanged may cause an error in the amplitude of the peak value of the characteristic curve.

(2) This control permits a sweep signal frequency variation per unit time to be changed by varying the sweep generation drive signal near the marker. When the control is turned fully clockwise, it minimizes the frequency variation, thereby permitting accurate tracking point measurement.

(3) If the SWEEP MAG control permits an accurate peak value measurement with no other controls used, the sweep time can be short (no display flickering occurs).

Generally these controls should be set as follows:

SWEEP TIME ..... Fully clockwise (↻)

SWEEP MAG ..... Fully clockwise (↻)

But they may be set at another position for efficient and accurate measurements, depending on the purpose for which the instrument is used.

3.4.5 Measurement porcedure

(1) The output voltage should be taken from the RF OUTPUT connector through either a loop antenna or RF cable attached as accessory, and then applied to the device to be measured. The output voltage of the units in this series is 100 mVrms when terminated by 50Ω load.

(2) The signal from the device being measured is passed through a detector, then applied to the V INPUT connector of Sweemar Scope.

(3) The attenuator value should be adjusted appropriately so that the device being measured does not receive excessive input. Also V, GAIN and the vertical positioning control of the monitor section should be set for the trace on the screen to be watched easily.

(4) Tracking adjustments may be made by changing the tuned frequency of the device being measured.

3.4.6 Notes on measuring

General

When using a sweep signal generator to make tracking adjustments, the amplitude of the characteristic curve on the screen will appear lower than it actually is. This amplitude drop would be compared with the measurement value obtained by using a standard signal generator by using the equation below.

$$a = \left[1 + 0.195 \left(\frac{F}{TB^2} \right)^2 \right]^{\frac{1}{4}}$$

a : level drop ratio

F : Sweep frequency width (Hz)

T : Sweep rate (sec)

B : 3 dB bandwidth (Hz) of the device being measured.

The apparent bandwidth is calculated by the following equation.

$$= \frac{B}{a^2}$$

a : The level drop ratio obtained from the above equation.

B : 3 dB bandwidth (Hz) of the device being measured.

To make accurate measurements, it would be better to have slower sweep speed and narrower sweep width. However, in an actual measurement,there is a limit due to flicker of the trace and increase in measurement time.

For the ideal tracking adjustment in a radio receiver;

(1) Rotate dial of the radio receiver under test to tune it to a desired frequency.

(2) With the radio receiver left in the same state, apply the RF OUTPUT signal and observe the characteristic curve. Position the characteristic curve in the center of the screen by making sweep width narrow.

(3) The characteristic curve should appear on the screen as shown in the Fig. 3-4-1 below. Now changing the setting value of the digital marker switch, bring the marker to the highest point of the characteristic curve.

(4) Then restore the sweep width to normal by adjusting SWEEP WIDTH control.

(5) Sometimes marker may be seen shifted from top of the characteristic curve as shown in Fig. 3-4-2.

(6) In this case, move the marker to the top by resetting the digital marker switch as shown Fig. 3-4-3.

(7) This state faithfully represents the tracking marker, by this sweep generator, taking every factor like sweep time, bandwidth, delay etc. into consideration.

Fig. 3-4-1

Fig. 3-4-2

Fig. 3-4-3

3.5 Attaching light shield hood

The light shield hood is included as an accessory, and should be mounted on the unit to block unwanted light and make the screen easier to see. It is attached by the procedures listed below.

(1) Loosen 3 of the outer cabinet fastening screws from around the front panel. (1 on the top, and 1 on each side.)

(2) Match the hood to the 3 screws and push it back as far as it will go. Tighten the screws.

Section 4. MAINTENANCE

4.1 Adjusting inclination of trace

The horizontal trace may appear inclined on the screen due to the effects of earth magnetism etc. This will vary depending on the particular location the unit is used, However, when the horizontal trace is not parallel to the horizontal graticule, it must be adjusted using the following procedure.

(1) Remove the two screws from the top of the cabinet.

> NOTE DANGER
>
> The high-voltage CRT accelerator circuit is located inside this portion of the cabinet. Be particularly careful not to make contact with it.

(2) Loosen the hook-screw holding the deflection-yoke on the neck of the CRT. While observing the screen, bring the horizontal trace parallel to the horizontal graticule by rotating the deflection yoke in extremely small increments.

(3) When it is accurately matched, tighten up the hook-screw holding the deflection yoke. When doing this, tighten up the hook-screw while pushing the yoke gently toward the screen side to prevent it from slipping off onto the socket of the tube.

4.2 Cleaning graticule plate

When the graticule plate becomes dirty, brightness of the tube is sharply reduced and the display becomes hard to see. It should be cleaned periodically.

(1) Removal

The graticule plate is held in at the four points indicated by

the arrows in Fig. 4.2.1. The plate is removed by pressing in and rotating it either right or left.

(2) Cleaning

The front and rear of the graticule plate, and the screen of the CRT should be cleaned using a clean, dry cloth. Do not use alcohol, tetrachlorides, acetone, or other organic solvents.

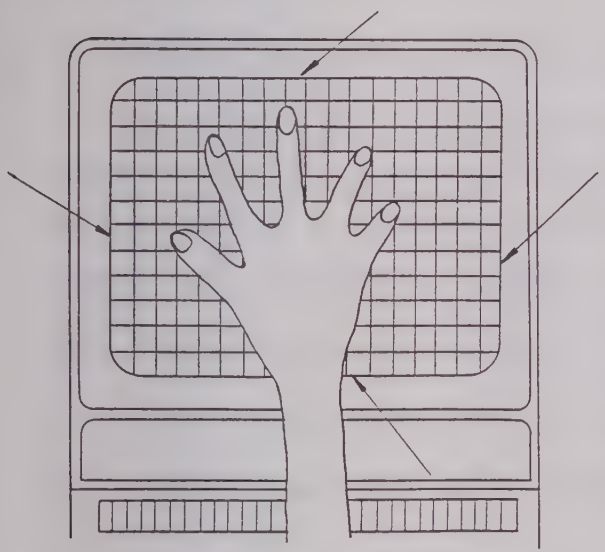


Fig. 4.2.1

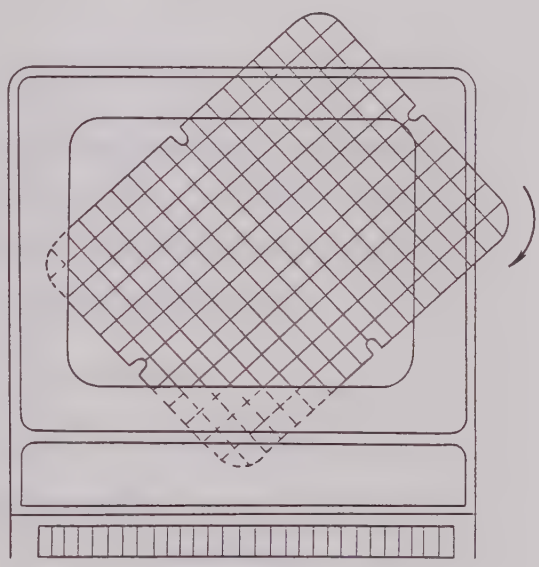


Fig. 4.2.2

(3) Installation

The corners of the plate should be slipped between the frame and the screen as shown in Fig. 4.2.2, and then rotated slowly in the direction of the arrow. The indentations cut into each edge of the plate will fit into projections behind the panel. When the plate is correctly installed, there should be very little movement in the plate. Check and make sure that the graticule plate fits in the frame.

4.3 Maintenance precautions

This section covers the procurement of parts, special precautions in replacing parts, and service.

4.3.1 Procurement of spare parts

The electrical components and the mechanical parts for the units of this series may be obtained from the dealer from whom this instrument is obtained.

4.3.2 Special precautions in replacing parts

As a rule, the manufacturer recommends that the unit be shipped to one of its service centers qualified to make repairs on the unit when it is in need of service. The owner choosing to replace parts himself should note the following items.

(1) The h_{fe} designation rank of the transistors.

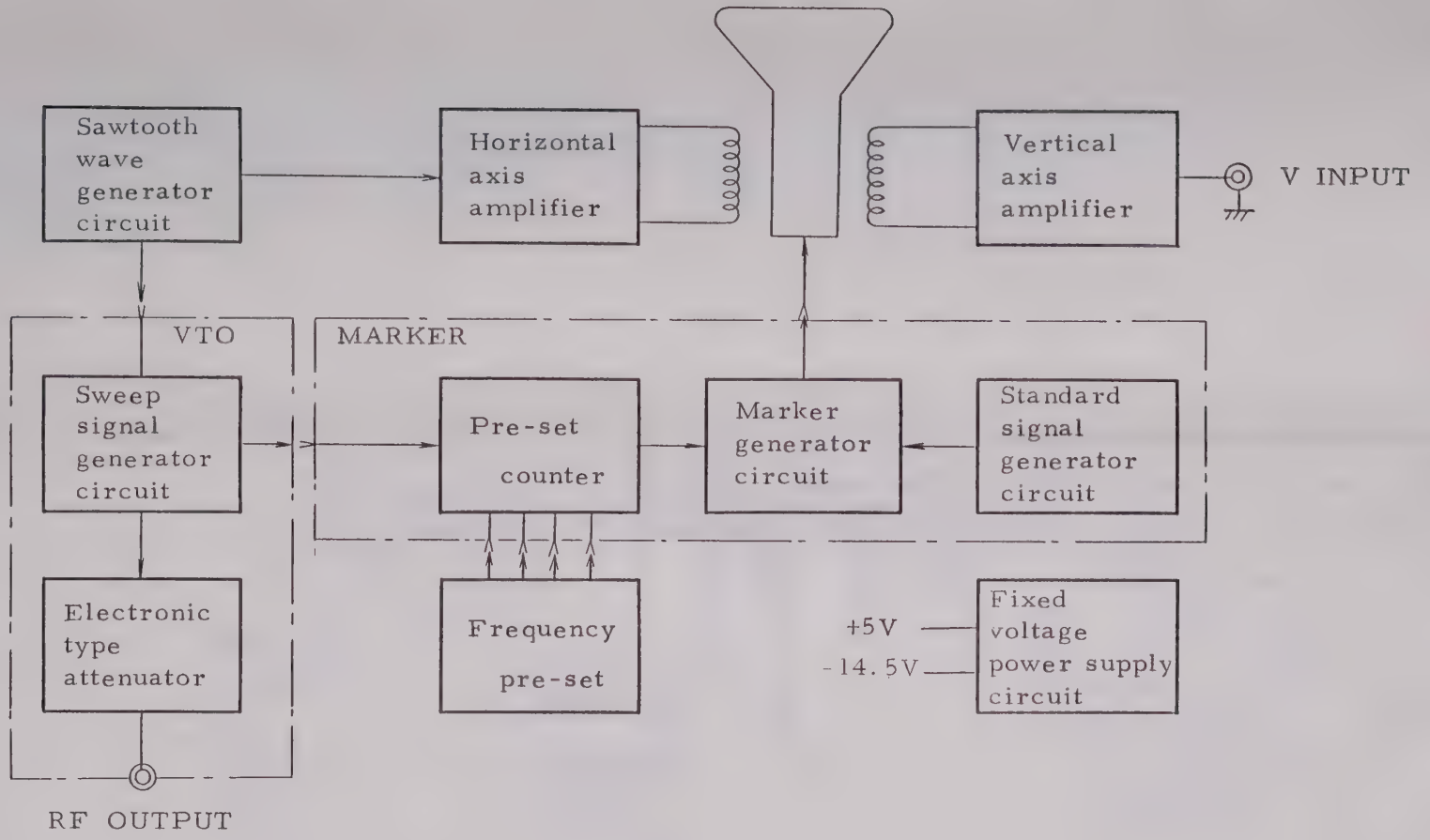
(2) The working voltage of the electrolytic capacitors.

(3) The wattage rating of the fixed resistors.

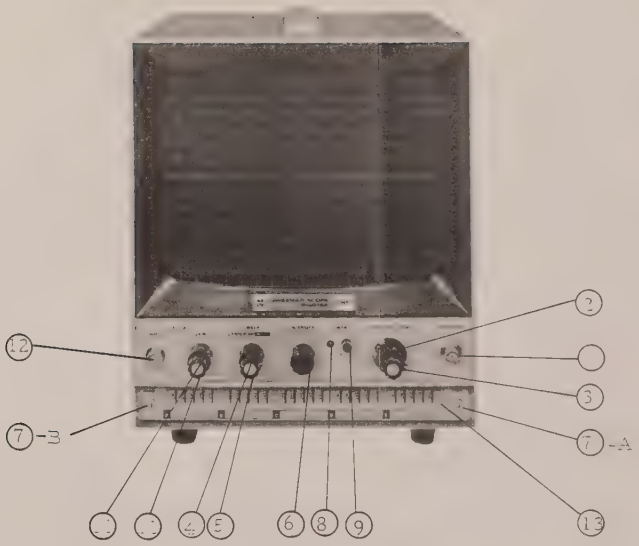
4.3.3 Communications with service center

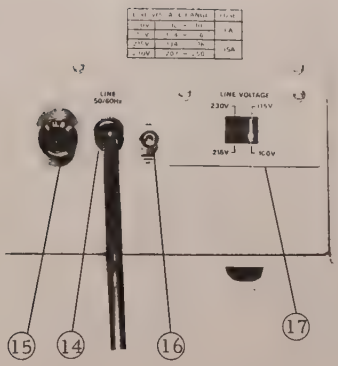
When it becomes necessary to write to or otherwise contact one of the service centers concerning your unit, the following data should be included.

- Model (VP-8911A etc.)
- Serial number of the set (Label on rear panel)
- Symptoms



VP-8915A Block Diagram


12
2
3
7-B
7-A
13
6
8
9


LINE
50/60Hz
LINE VOLTAGE
230V
115V
215V
100V
15
14
16
17

VP-8915A CIRCUIT DIAGRAMS

OVERALL INTERCONNECTION	A1
MONITOR	A2
VHF VTO	A3
MARKER (1)	A4
MARKER (2)	A5
MATRIX	A6

NOTES

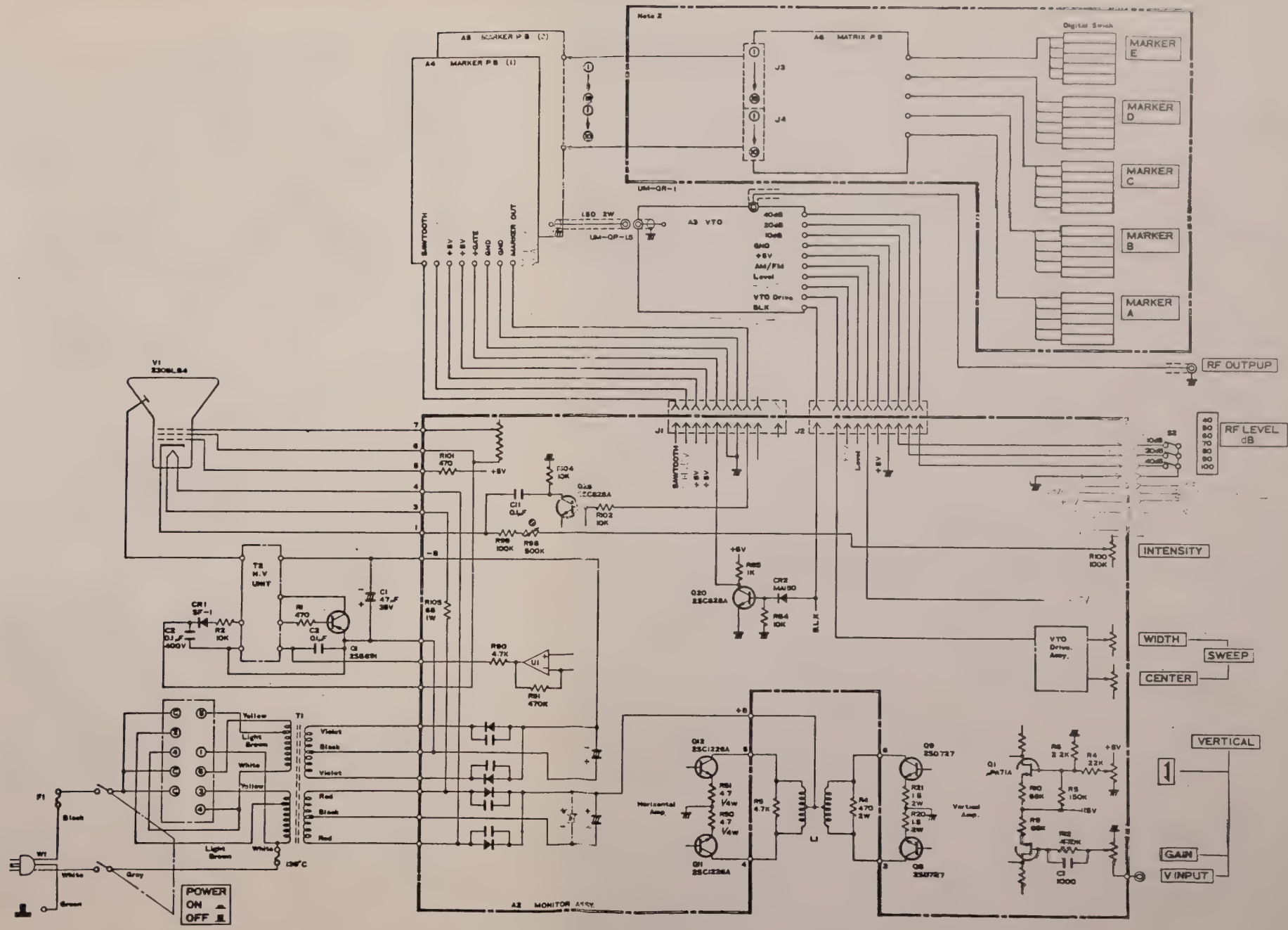
1. WHEN THE CIRCUIT IS DIVIDED INTO SOME UNITS AND AN IDENTIFYING NUMBER IS ASSIGNED TO EACH UNIT, REFERENCE DESIGNATORS IN EACH CIRCUIT DIAGRAM ARE GIVEN IN ABBREVIATED FORM. PREFIX WITH EACH IDENTIFYING NUMBER FOR COMPLETE DESCRIPTION.
   EXAMPLES; A1C1, A6R3.

2. RESISTANCE VALUES IN OHMS AND CAPACITANCE IN PICOFARADS(FROM 1 TO 9,999) OR MICROFARADS (FROM 0.01 TO 0.99) UNLESS OTHERWISE NOTED.

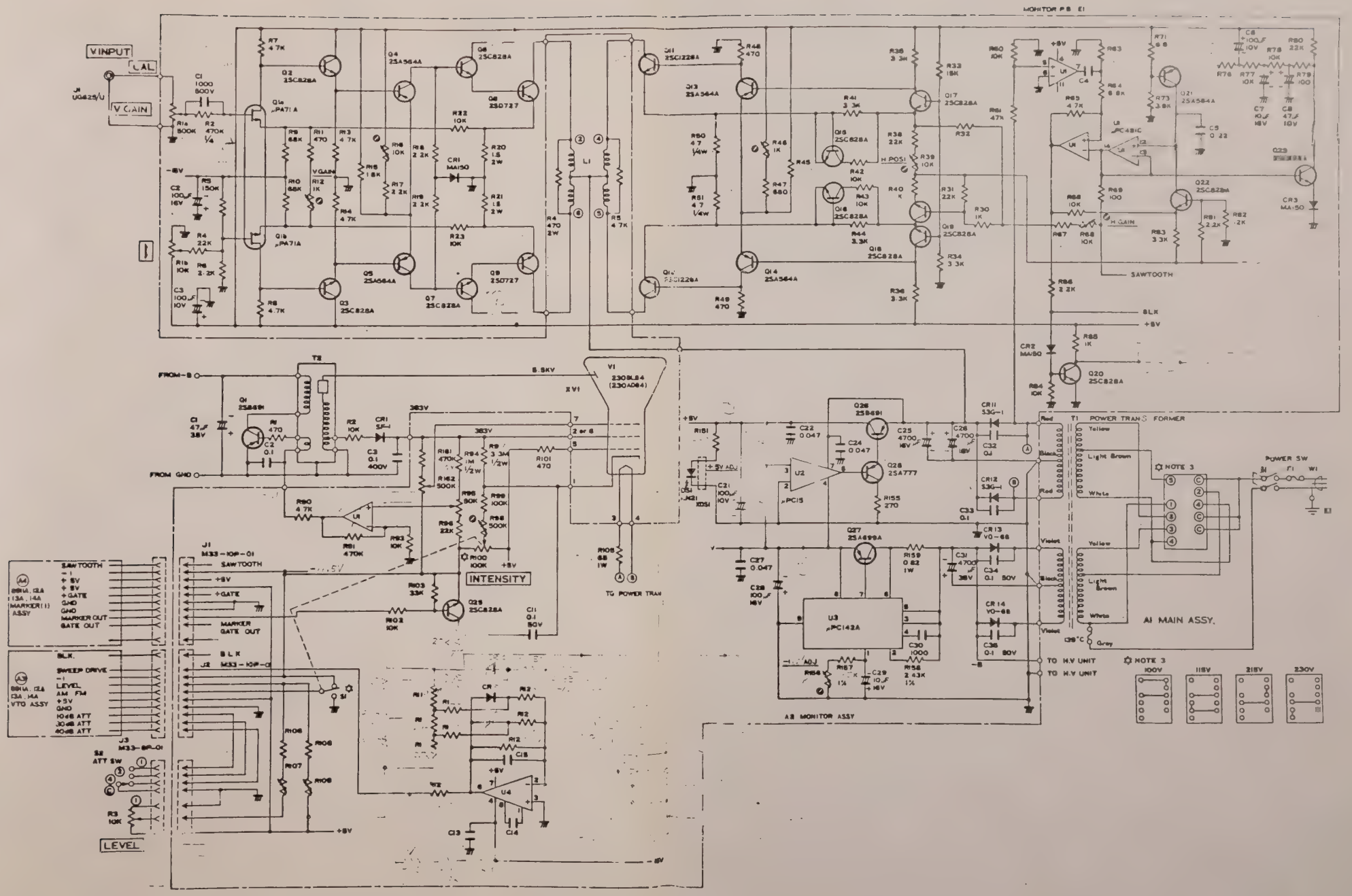
3. POWER RATINGS AND RESISTANCE TOLERANCES OF FIXED RESISTORS ARE 1/8 WATTS AND ±5% UNLESS OTHERWISE NOTED.

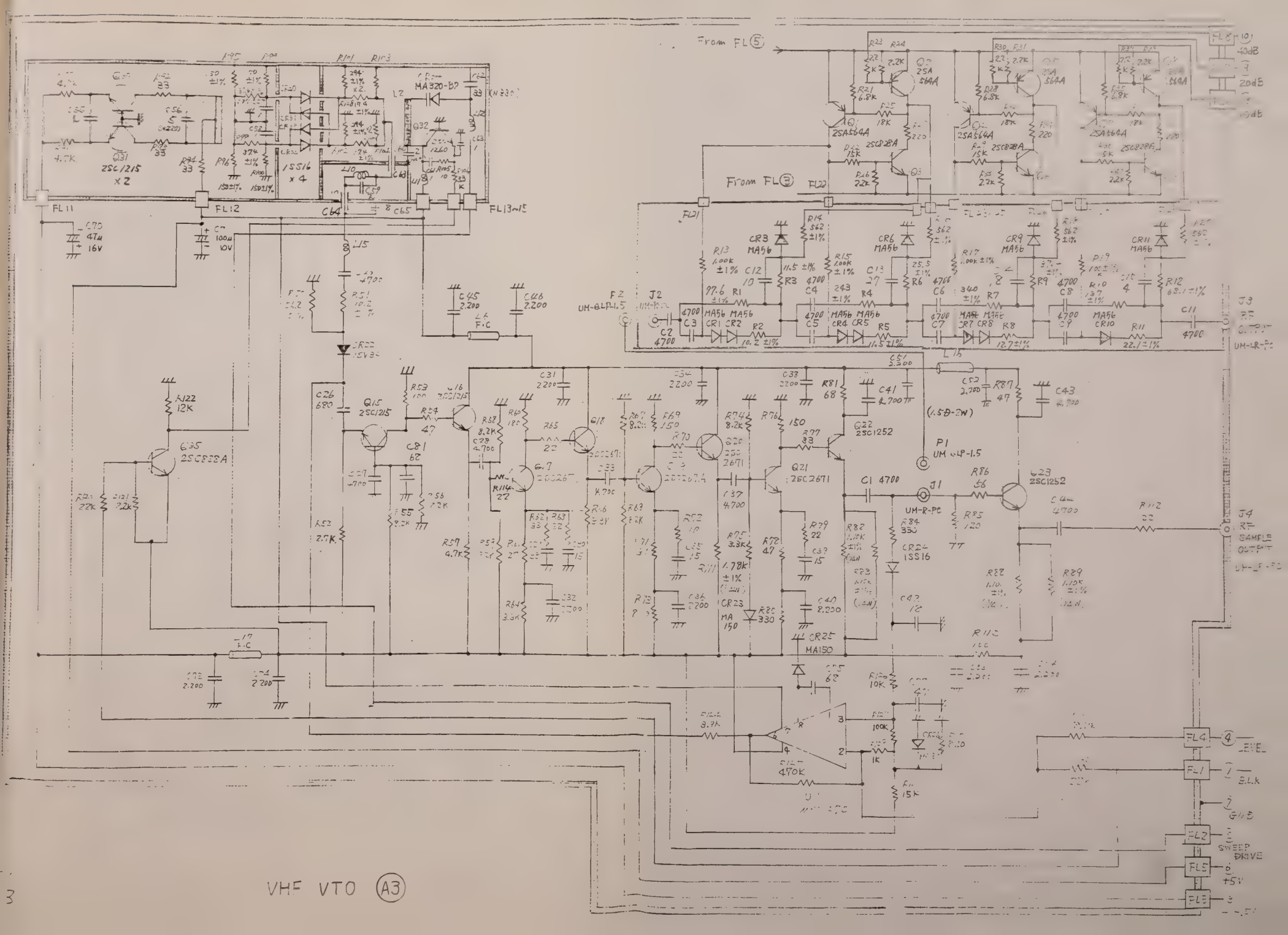
4. ** FACTORY REWORKED OR CHECKED COMPONENTS.

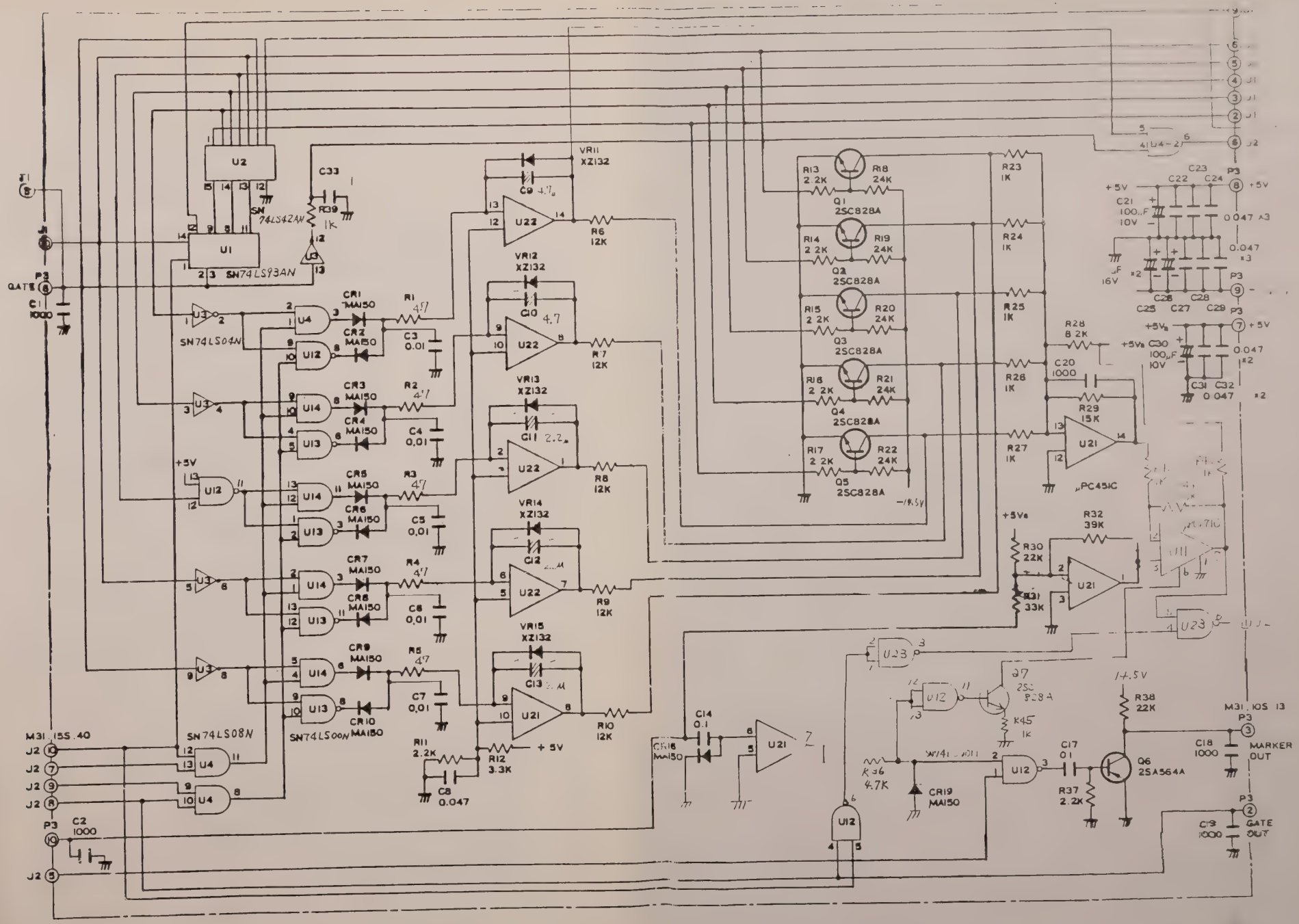
5. * VALUE SELECTED AT FACTORY. NOMINAL VALUE SHOWN.



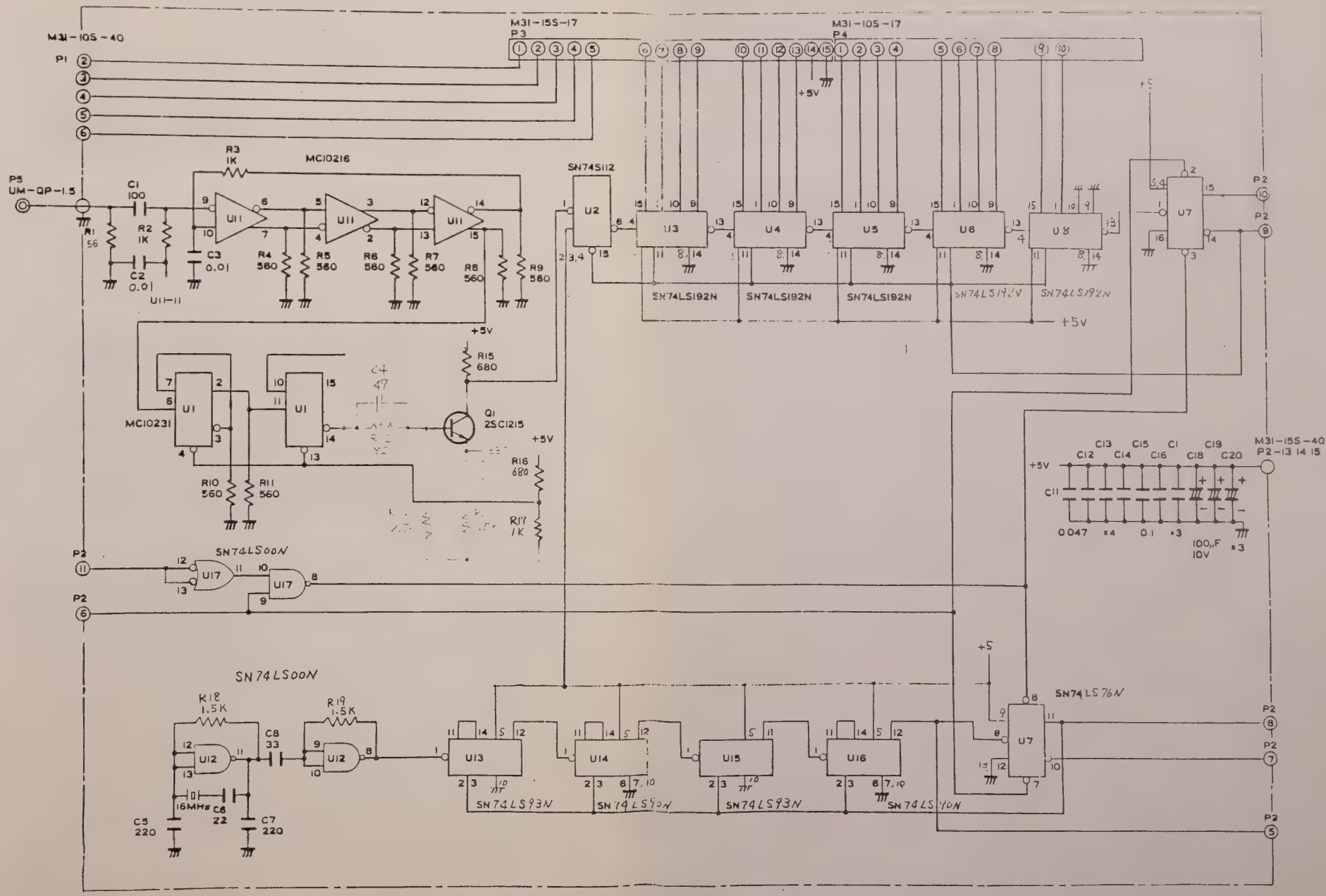
OVERALL INTERCONNECTION (A1)


VINPUT
CAL
V GAIN
INTENSITY
LEVEL
SAWTOOTH
+8V
+GATE
MARKER OUT
GATE OUT
BLK.
SWEEP DRIVE
LEVEL
AM FM
+5V
GND
10dB ATT
20dB ATT
40dB ATT
TO H.V UNIT
TO H.V UNIT
A1 MAIN ASSY.
A2 MONITOR ASSY
POWER TRANSFORMER
POWER SW
NOTE 3
100V
115V
215V
230V

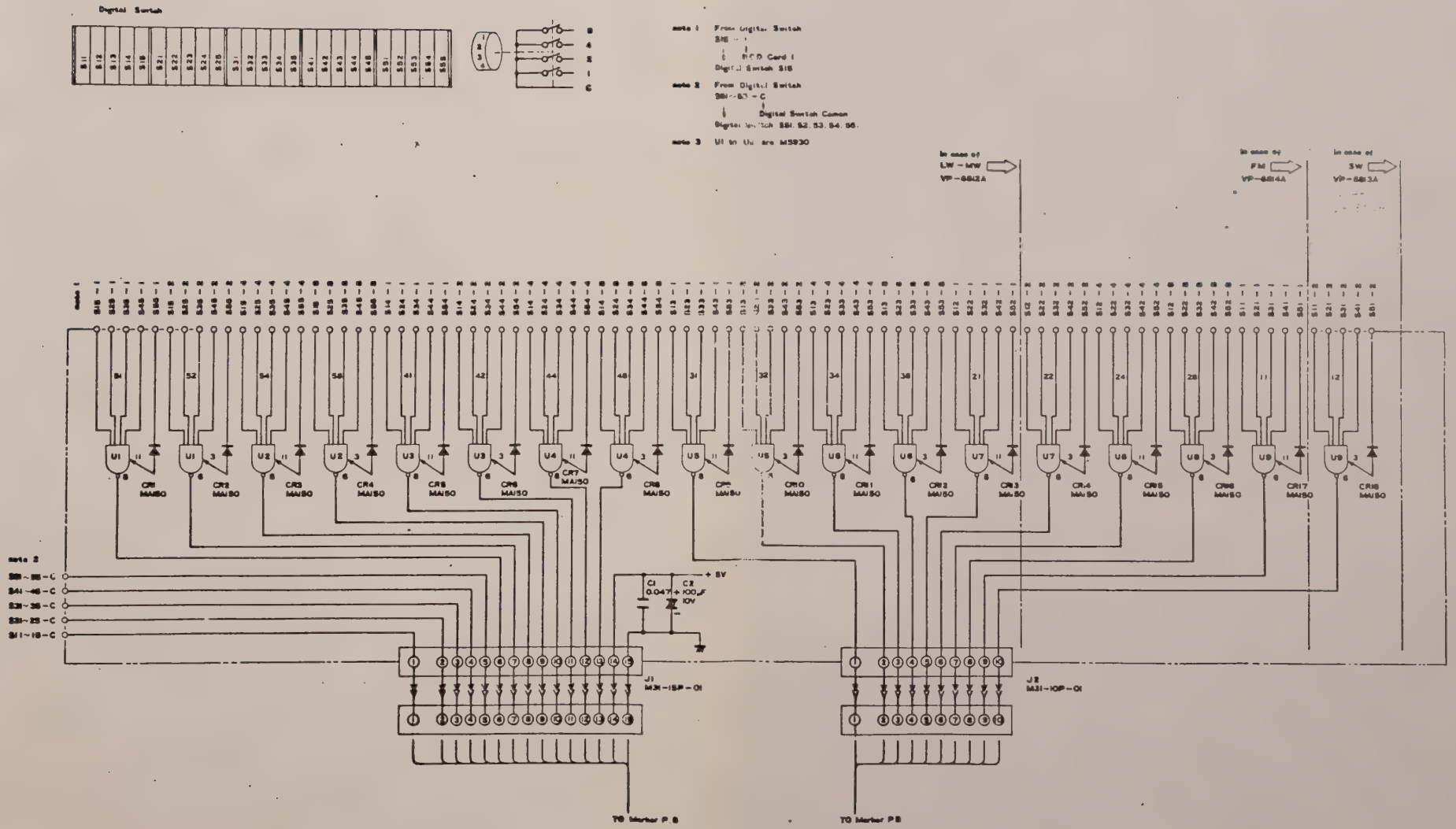

From FL⑤
From FL③
FL11
FL12
FL13~15
FL1
FL2
FL3
FL4
FL5
J1
J2
J3
J4
P1
Q15 2SC1215
Q18 2SC2671
Q21 2SC2671
Q22 2SC1252
Q23 2SC1252
Q35 2SC828A
CR23 MA150
CR24 1SS16
CR25 MA150
VHF VTO (A3)


U2
SN 74LS42AN
U1
SN74LS93AN
SN74LS04N
SN74LS08N
SN74LS00N
MAI50
XZ132
2SC828A
2SA564A
μPC451C
+5V
+5Va
-8.5V
14.5V
MARKER OUT
GATE OUT

MARKER (1)



VHF MARKER (2) (A15)


Digital Switch
note 1
note 2
note 3
In case of LW – MW VP – 6812A
In case of FM VP – 6814A
In case of SW VP – 6813A
CR1 MA150
CR2 MA150
CR3 MA150
CR4 MA150
CR5 MA150
CR6 MA150
CR7 MA150
CR8 MA150
CR9 MA150
CR10 MA150
CR11 MA150
CR12 MA150
CR13 MA150
CR14 MA150
CR15 MA150
CR16 MA150
CR17 MA150
CR18 MA150
C1 0.047
C2 + 100 μF 10V
+ 5V
J1 MJK – 15P – 01
J2 MJI – 10P – 01
TO Marker P.B
TO Marker P.B

MATRIX

A – 0 7 8 4

PARTS LIST

.	4G202999	MATRIX	3-1
.	4G203362	MONITOR	3-3
.	4G203363	VTO DRIVE	3-7
.	4G203364	VTO	3-9
.	4G203365	MKR-1-C	3-16
.	4G203366	MKR-1-E	3-18
.	4G203367	MKR-2	3-19
.	4G203368	PANEL	3-20
.	4G203428	OVERALL	3-21
.	4G301837	MECHA-E	3-22
.	4G302221	MECHA-C	3-23
.	4G301838	PACKAGE	3-24

MATRIX DWG NO 4G202999

REF NO	QTY	PART NO	DESCRIPTION	
C 1	1	ECKD1E473ZF2	C:FXD CER HI-K	47000PF +80-20% 25V
C 2	1	ECEB1AS101	C:FXD AL ELECT	100UF +-20% 10V
CR 1	1	MA150TA	DIODE:SI	100MA 35V
CR 2	1	MA150TA	DIODE:SI	100MA 35V
CR 3	1	MA150TA	DIODE:SI	100MA 35V
CR 4	1	MA150TA	DIODE:SI	100MA 35V
CR 5	1	MA150TA	DIODE:SI	100MA 35V
CR 6	1	MA150TA	DIODE:SI	100MA 35V
CR 7	1	MA150TA	DIODE:SI	100MA 35V
CR 8	1	MA150TA	DIODE:SI	100MA 35V
CR 9	1	MA150TA	DIODE:SI	100MA 35V
CR 10	1	MA150TA	DIODE:SI	100MA 35V
CR 11	1	MA150TA	DIODE:SI	100MA 35V
CR 12	1	MA150TA	DIODE:SI	100MA 35V
CR 13	1	MA150TA	DIODE:SI	100MA 35V
CR 14	1	MA150TA	DIODE:SI	100MA 35V
CR 15	1	MA150TA	DIODE:SI	100MA 35V
CR 16	1	MA150TA	DIODE:SI	100MA 35V
CR 17	1	MA150TA	DIODE:SI	100MA 35V
CR 18	1	MA150TA	DIODE:SI	100MA 35V
E 1	1	A7M2P	ROTARY SW	SPACER
E 2	1	A7M2P	ROTARY SW	SPACER
E 3	1	A7M2P	ROTARY SW	SPACER
E 4	1	A7M2P	ROTARY SW	SPACER
E 10	1	A7M2M	ROTARY SW	PANEL
E 11	1	3G400858	P8913A PC BOARD	MATRIX
J 1	1	M3115P01	CONNECTOR:PIN	15P
J 2	1	M3310P01	CONNECTOR:PIN	10P STRAIGHT
S 11	1	A7MA206	ROTARY SW	UNIT
S 12	1	A7MA206	ROTARY SW	UNIT
S 13	1	A7MA206	ROTARY SW	UNIT
S 14	1	A7MA206	ROTARY SW	UNIT
S 15	1	A7MA206	ROTARY SW	UNIT
S 21	1	A7MA206	ROTARY SW	UNIT
S 22	1	A7MA206	ROTARY SW	UNIT
S 23	1	A7MA206	ROTARY SW	UNIT
S 24	1	A7MA206	ROTARY SW	UNIT
S 25	1	A7MA206	ROTARY SW	UNIT
S 31	1	A7MA206	ROTARY SW	UNIT
S 32	1	A7MA206	ROTARY SW	UNIT
S 33	1	A7MA206	ROTARY SW	UNIT
S 34	1	A7MA206	ROTARY SW	UNIT
S 35	1	A7MA206	ROTARY SW	UNIT

MATRIX DWG NO 4G202999

REF NO	QTY	PART NO	DESCRIPTION	
S 41	1	A7MA206	ROTARY SW	UNIT
S 42	1	A7MA206	ROTARY SW	UNIT
S 43	1	A7MA206	ROTARY SW	UNIT
S 44	1	A7MA206	ROTARY SW	UNIT
S 45	1	A7MA206	ROTARY SW	UNIT
S 51	1	A7MA206	ROTARY SW	UNIT
S 52	1	A7MA206	ROTARY SW	UNIT
S 53	1	A7MA206	ROTARY SW	UNIT
S 54	1	A7MA206	ROTARY SW	UNIT
S 55	1	A7MA206	ROTARY SW	UNIT
U 1	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND
U 2	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND
U 3	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND
U 4	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND
U 5	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND
U 6	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND
U 7	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND
U 8	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND
U 9	1	M5930P	IC:DTL	DUAL EXPANDABLE NAND

MONITOR DWG NO 4G203362

REF NO	QTY	PART NO	DESCRIPTION	
C 1	1	ECKW2H102MD	C:FXD CER HI-K	1000PF +-20% 500V
C 2	1	ECEA1CS101	C:FXD AL ELECT	100UF +-20% 16V
C 3	1	ECEA1AS101	C:FXD AL ELECT	100UF +-20% 10V
C 4	1	ECQP1223GZ	C:FXD FLM	0.022UF 2% 100V
C 5	1	ECQP1224GZ	C:FXD FLM	0.22UF 2% 100V
C 6	1	ECEA1AS101	C:FXD AL ELECT	100UF +-20% 10V
C 7	1	ECEA1CS100	C:FXD AL ELECT	10UF +-20% 16V
C 8	1	ECEA1AS470	C:FXD AL ELECT	47UF +-20% 10V
C 11	1	77C08	C:FXD CER TC	100000PF +80% -20% 50V
C 21	1	ECEA1AS101	C:FXD AL ELECT	100UF +-20% 10V
C 22	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 24	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 25	1	ECET16R472SW	C:FXD AL ELECT	4700UF +30%-10% 16V
C 26	1	ECET16R472SW	C:FXD AL ELECT	4700UF +30%-10% 16V
C 27	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 28	1	ECEA1CS101	C:FXD AL ELECT	100UF +-20% 16V
C 29	1	ECEA1CS100	C:FXD AL ELECT	10UF +-20% 16V
C 30	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
C 31	1	ECET35R472SW	C:FXD AL ELECT	4700UF +30%-10% 35V
C 32	1	ECKD1E104ZFZ	C:FXD CER HI-K	100000PF +80-20% 25V
C 33	1	ECKD1E104ZFZ	C:FXD CER HI-K	100000PF +80-20% 25V
C 34	1	77C08	C:FXD CER TC	100000PF +80% -20% 50V
C 35	1	77C08	C:FXD CER TC	100000PF +80% -20% 50V
C 51	1	ECKF1H104ZV	C:FXD CER HI-K	0.1UF +80%-20% 50V
C 52	1	ECKF1H104ZV	C:FXD CER HI-K	0.1UF +80%-20% 50V
C 55	1	ECKF1H103ZF	C:FXD CER HI-K	10000PF +80-20% 50V
CR 1	1	MA150TA	DIODE:SI	100MA 35V
CR 2	1	MA150TA	DIODE:SI	100MA 35V
CR 3	1	MA150TA	DIODE:SI	100MA 35V
CR 11	1	S3V10	DIODE:PWR RECT	3.5A 100V
CR 12	1	S3V10	DIODE:PWR RECT	3.5A 100V
CR 13	1	V06B	DIODE:SI	1.3A 600V
CR 14	1	V06B	DIODE:SI	1.3A 600V
CR 15	1	1S1544A	DIODE:SI	100MA 30V
CR 16	1	1S1544A	DIODE:SI	100MA 30V
DS 1	1	LN21	LED	RED
E 1	1	2G400643	P8915A PC BOARD	MONITOR
J 1	1	M3310P01	CONNECTOR:PIN	10P STRAIGHT
J 2	1	M3310P01	CONNECTOR:PIN	10P STRAIGHT
J 3	1	M3310P01	CONNECTOR:PIN	10P STRAIGHT
J 4	1	M3310P01	CONNECTOR:PIN	10P STRAIGHT
J 5	1	M3305P01	CONNECTOR:PIN	5P STRAIGHT

MONITOR DWG NO 4G203362

REF NO	QTY	PART NO	DESCRIPTION	
Q 1	1	UPA71AM	TSTR:FET	PC:250MW
Q 2	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 3	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 4	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q 5	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q 6	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 7	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 8	1	2SD727-PQ	TSTR:SI NPN	PC:600MW FT:200MHZ
Q 9	1	2SD727-PQ	TSTR:SI NPN	PC:600MW FT:200MHZ
Q 11	1	2SC1226A-QR	TSTR:SI NPN	PC:10W FT:150MHZ
Q 12	1	2SC1226A-QR	TSTR:SI NPN	PC:10W FT:150MHZ
Q 13	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q 14	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q 15	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 16	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 17	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 18	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 19	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 20	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 21	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q 22	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 23	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 25	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 26	1	2SB691-PQ	TSTR:GE PNP	PC:600MW FT:7MHZ
Q 27	1	2SA699A-QR	TSTR:SI PNP	PC:10W FT:150MHZ
Q 28	1	2SA777-RS	TSTR:SI PNP	PC:750MW FT:120MHZ
R 1	1	EVKZ53Z56172	R:VAR CARBON	500K-10K OHM 20% 1/5W
R 2	1	ERD25TJ474V	R:FXD CARBON	470K OHM 5% 1/4W
R 4	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 5	1	ERD25TJ154V	R:FXD CARBON	150K OHM 5% 1/4W
R 6	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 7	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
R 8	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
R 9	1	ERD25TJ683V	R:FXD CARBON	68K OHM 5% 1/4W
R 10	1	ERD25TJ683V	R:FXD CARBON	68K OHM 5% 1/4W
R 11	1	ERD25TJ471V	R:FXD CARBON	470 OHM 5% 1/4W
R 12	1	EVTR4SA00B13	R:VAR CARBON	1K OHM 20% 1/4W
R 13	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
R 14	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
R 15	1	ERD25TJ182V	R:FXD CARBON	1.8K OHM 5% 1/4W
R 16	1	EVTR4SA00B14	R:VAR CARBON	10K OHM 20% 1/4W

MONITOR DWG NO 4G203362

REF NO	QTY	PART NO	DESCRIPTION	
R 17	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 18	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 19	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 20	1	ERX2ANJ1R5	R:FXD MET OXD	1.5 OHM 5% 2W
R 21	1	ERX2ANJ1R5	R:FXD MET OXD	1.5 OHM 5% 2W
R 22	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 23	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 25	1	ERD25TJ271V	R:FXD CARBON	270 OHM 5% 1/4W
R 26	1	ERD25TJ271V	R:FXD CARBON	270 OHM 5% 1/4W
R 30	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 31	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 32	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 33	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W
R 34	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 35	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 36	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 38	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 39	1	EVTR4SA00B14	R:VAR CARBON	10K OHM 20% 1/4W
R 40	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 41	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 42	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 43	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 44	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 45	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W
R 46	1	EVTR4SA00B13	R:VAR CARBON	1K OHM 20% 1/4W
R 47	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W
R 48	1	ERD25TJ471V	R:FXD CARBON	470 OHM 5% 1/4W
R 49	1	ERD25TJ471V	R:FXD CARBON	470 OHM 5% 1/4W
R 50	1	ERD25TJ4R7V	R:FXD CARBON	4.7 OHM 5% 1/4W
R 51	1	ERD25TJ4R7V	R:FXD CARBON	4.7 OHM 5% 1/4W
R 55	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 60	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 61	1	ERD25TJ473V	R:FXD CARBON	47K OHM 5% 1/4W
R 63	1	ERD25TJ152V	R:FXD CARBON	1.5K OHM 5% 1/4W
R 64	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W
R 65	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
R 66	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 67	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W
R 68	1	EVTR4SA00B14	R:VAR CARBON	10K OHM 20% 1/4W
R 69	1	ERD25TJ101V	R:FXD CARBON	100 OHM 5% 1/4W
R 71	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W

MONITOR DWG NO 4G203362

REF NO	QTY	PART NO	DESCRIPTION	
R 73	1	ERD25TJ392V	R:FXD CARBON	3.9K OHM 5% 1/4W
R 74	1	ERD25TJ393V	R:FXD CARBON	39K OHM 5% 1/4W
R 75	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 76	1	ERD25TJ154V	R:FXD CARBON	150K OHM 5% 1/4W
R 77	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 78	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 79	1	ERD25TJ101V	R:FXD CARBON	100 OHM 5% 1/4W
R 80	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 81	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 82	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 83	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 84	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 85	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 86	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 90	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
R 91	1	ERD25TJ474V	R:FXD CARBON	470K OHM 5% 1/4W
R 93	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 94	1	ERC12GJ105	R:FXD COMP	1M OHM 5% 1/2W
R 95	1	EVTR4SA00B54	R:VAR CARBON	50K OHM 20% 1/4W
R 96	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 97	1	ERC12GK335	R:FXD COMP	3.3M OHM 10% 1/2W
R 98	1	EVTR4SA00B55	R:VAR CARBON	500K OHM 20% 1/4W
R 99	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W
R 101	1	ERD25TJ471V	R:FXD CARBON	470 OHM 5% 1/4W
R 102	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 103	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W
R 104	1	EVTR4SA00B24	R:VAR CARBON	20K OHM 20% 1/4W
R 105	1	ERG1ANJ680	R:FXD MET OXD	68 OHM 5% 1W
R 141	1	EVKZ53Z56B14	R:VAR CARBON	10K X2 OHM 20% 1/5W
R 151	1	ERD25TJ331V	R:FXD CARBON	330 OHM 5% 1/4W
R 152	1	ERO25CKF5231	R:FXD MET FLM	5.23K OHM 1% 1/4W
R 154	1	ERO25CKF1502	R:FXD MET FLM	15K OHM 1% 1/4W
R 155	1	ERD25TJ271V	R:FXD CARBON	270 OHM 5% 1/4W
R 156	1	EVTR4SA00B13	R:VAR CARBON	1K OHM 20% 1/4W
R 157	1	ERO25CKF6651	R:FXD MET FLM	6.65K OHM 1% 1/4W
R 158	1	ERO25CKF2431	R:FXD MET FLM	2.43K OHM 1% 1/4W
R 159	1	ERX1ANJR82	R:FXD MET OXD	0.82 OHM 5% 1W
R 161	1	ERD25TJ474V	R:FXD CARBON	470K OHM 5% 1/4W
R 162	1	EVTR4SA00B55	R:VAR CARBON	500K OHM 20% 1/4W
R 200	1	ERD25TJ101V	R:FXD CARBON	100 OHM 5% 1/4W
U 1	1	UPC451C	IC:OP AMP	QUAD
U 2	1	UPC151C	IC:OP AMP	
U 3	1	UPC142A	IC:V RGLTR	NEGATIVE ADJUSTABLE REG
XDS 1	1	163683-1	CONNECTOR:PIN	CIS 3P 2.5PITCH

VTO DRIVE DWG NO 4G203363

REF NO	QTY	PART NO	DESCRIPTION	
C 13	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
C 14	1	ECCW1H680KC5	C:FXD CER TC	68PF +-10% 50V NPO
C 15	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
CR 4	1	MA150TA	DIODE:SI	100MA 35V
CR 5	1	MA150TA	DIODE:SI	100MA 35V
CR 6	1	MA150TA	DIODE:SI	100MA 35V
CR 10	1	MA150TA	DIODE:SI	100MA 35V
E 1	1	CM2	CONNECTOR	POWER AC125V 15A
E 2	1	R76K-SR5P4	BUSHING-SR-5P-4	
F **	1	TSC1A	FUSE	1A 250V 20MM
F 1	1	TSC1A	FUSE	1A 250V 20MM
R 100	1	EVHZ05Z08B15	R:VAR CARBON	100K OHM 20% 1/5W
R 106	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 107	1	EVTR4SA00B24	R:VAR CARBON	20K OHM 20% 1/4W
R 108	1	ERD25TJ101V	R:FXD CARBON	100 OHM 5% 1/4W
R 109	1	EVTR4SA00B53	R:VAR CARBON	5K OHM 20% 1/4W
R 111	1	ERD25TJ683V	R:FXD CARBON	68K OHM 5% 1/4W
R 112	1	EVTR4SA00B54	R:VAR CARBON	50K OHM 20% 1/4W
R 115	1	ERD25TJ182V	R:FXD CARBON	1.8K OHM 5% 1/4W
R 116	1	EVTR4SA00B13	R:VAR CARBON	1K OHM 20% 1/4W
R 117	1	ERD25TJ122V	R:FXD CARBON	1.2K OHM 5% 1/4W
R 119	1	EVTR4SA00B13	R:VAR CARBON	1K OHM 20% 1/4W
R 120	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W
R 121	1	ERD25TJ272V	R:FXD CARBON	2.7K OHM 5% 1/4W
R 122	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 123	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 124	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 125	1	ERD25TJ154V	R:FXD CARBON	150K OHM 5% 1/4W
R 126	1	ERD25TJ334V	R:FXD CARBON	330K OHM 5% 1/4W
R *126	1	ERD25TJ474V	R:FXD CARBON	470K OHM 5% 1/4W
R 127	1	ERD25TJ124V	R:FXD CARBON	120K OHM 5% 1/4W
R 128	1	ERD25TJ124V	R:FXD CARBON	120K OHM 5% 1/4W
R 129	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 130	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W
R 131	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 133	1	ERD25TJ563V	R:FXD CARBON	56K OHM 5% 1/4W
R 134	1	ERD25TJ474V	R:FXD CARBON	470K OHM 5% 1/4W
R 135	1	ERD25TJ473V	R:FXD CARBON	47K OHM 5% 1/4W
R 136	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W
R 137	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 138	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 139	1	ERD25TJ330V	R:FXD CARBON	33 OHM 5% 1/4W

VTO DRIVE DWG NO 4G203363

REF NO	QTY	PART NO	DESCRIPTION	
U 4	1	UPC157C	IC:OP AMP	
W 1	1	77W02	CABLE:PWR (UL,CSA)	125V 10A

VTO DWG NO 4G203364

REF NO	QTY	PART NO	DESCRIPTION	
	9	163740-1	CONNECTOR:PIN	CIS 3P 2.5PITCH
	5	163740-3	CONNECTOR:PIN	CIS 5P 2.5PITCH
	4	163741-1	CONNECTOR:PIN	CIS 3P 2.5PITCH
	2	163741-3	CONNECTOR:PIN	CIS 5P 2.5PITCH
	1	4G633428-0L	LABEL:MOS CAUTION	
C	1	ECCF1H390JS	C:FXD CER TC	39PF 5% 50V
C 1	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 2	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 3	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 4	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 5	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 6	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 7	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 8	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 9	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 11	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 12	1	ECCF1H100FC	C:FXD CER TC	10PF +-1.0PF 50V NPO
C 13	1	ECCF1H270KC	C:FXD CER TC	27PF +-10% 50V NPO
C 14	1	ECCF1H180KC	C:FXD CER TC	18PF +-10% 50V NPO
C 15	1	ECCF1H040DC	C:FXD CER TC	4PF +-0.5PF 50V NPO
C 25	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 26	1	ECKF1H681KB	C:FXD CER HI-K	680PF +-10% 50V
C 27	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 28	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 29	1	ECCF1H330KC	C:FXD CER TC	33PF +-10% 50V NPO
C 30	1	ECCF1H150KC	C:FXD CER TC	15PF +-10% 50V NPO
C 31	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 32	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 33	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 34	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 35	1	ECCF1H150KC	C:FXD CER TC	15PF +-10% 50V NPO
C 36	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 37	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 38	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 39	1	ECCF1H150KC	C:FXD CER TC	15PF +-10% 50V NPO
C 40	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 41	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 42	1	ECCF1H180KC	C:FXD CER TC	18PF +-10% 50V NPO
C 43	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 44	1	4G440366	P4771A C:FXD CER	4700PF 10% 50V
C 45	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 46	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 51	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 52	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 53	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V

VTO DWG NO 4G203364

REF NO	QTY	PART NO	DESCRIPTION	
C 54	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 55	1	ECCF1H020CC	C:FXD CER TC	2PF +-0.25PF 50V NPO
C 56	1	ECCF1H050CR	C:FXD CER TC	5PF +-0.25PF 50V N220
C 57	1	ECCF1H010CC	C:FXD CER TC	1PF +-0.25PF 50V NPO
C 58	1	ECCF1H010CC	C:FXD CER TC	1PF +-0.25PF 50V NPO
C 59	1	ECCF1H020CC	C:FXD CER TC	2PF +-0.25PF 50V NPO
C 60	1	ECCF1H020CT	C:FXD CER TC	2PF +-0.25PF 50V N470
C 61	1	ECCF1H010CC	C:FXD CER TC	1PF +-0.25PF 50V NPO
C 63	1	ECCF1H010CC	C:FXD CER TC	1PF +-0.25PF 50V NPO
C 63	1	76C015	P8860B C:FXD CER	10PF +-0.1PF 50V
C 64	1	76C015	P8860B C:FXD CER	10PF +-0.1PF 50V
C 65	1	ECCF1H080DC	C:FXD CER TC	8PF +-0.5PF 50V NPO
C 70	1	ECEA1CS470	C:FXD AL ELECT	47UF +-20% 16V
C 71	1	ECEA1AS101	C:FXD AL ELECT	100UF +-20% 10V
C 73	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 74	1	ECKF1H222MD	C:FXD CER HI-K	2200PF +-20% 50V
C 75	1	ECCW1H101KC5	C:FXD CER TC	100PF +-10% 50V NPO
C 77	1	ECCF1H470KC	C:FXD CER TC	47PF +-10% 50V NPO
C 81	1	ECCF1H680KC	C:FXD CER TC	68PF +-10% 50V NPO
CR 1	1	MA56	DIODE:SI	100MA 20V
CR 2	1	MA56	DIODE:SI	100MA 20V
CR 3	1	MA56	DIODE:SI	100MA 20V
CR 4	1	MA56	DIODE:SI	100MA 20V
CR 5	1	MA56	DIODE:SI	100MA 20V
CR 6	1	MA56	DIODE:SI	100MA 20V
CR 7	1	MA56	DIODE:SI	100MA 20V
CR 8	1	MA56	DIODE:SI	100MA 20V
CR 9	1	MA56	DIODE:SI	100MA 20V
CR 10	1	MA56	DIODE:SI	100MA 20V
CR 11	1	MA56	DIODE:SI	100MA 20V
CR 22	1	1SV34	DIODE:PIN	50MA 100V
CR 23	1	MA150TA	DIODE:SI	100MA 35V
CR 24	1	1SS16	DIODE:SCHOTTKY	30MA 5V
CR 25	1	MA150TA	DIODE:SI	100MA 35V
CR 26	1	MA150TA	DIODE:SI	100MA 35V
CR 30	1	1SS16	DIODE:SCHOTTKY	30MA 5V
CR 31	1	1SS16	DIODE:SCHOTTKY	30MA 5V
CR 32	1	1SS16	DIODE:SCHOTTKY	30MA 5V
CR 33	1	1SS16	DIODE:SCHOTTKY	30MA 5V
CR 34	1	MA320B1-NQ	DIODE:SI	20MA 30V

VTO DWG NO 4G203364

REF	NO	QTY	PART NO	DESCRIPTION	
E	1	1	3G400947	P8915A PC BOARD A11	VTO (1)
E	2	1	4G400524	P8915A PC BOARD	VTO (2)
E	3	1	4G400525	P8915A PC BOARD	ATT CONTROL
E	4	1	4G400526	P8915A PC BOARD	VTO SHIELD (1)
E	5	1	4G400527	P8915A PC BOARD	VTO SHIELD (2)
E	6	1	4G400528	P8915A PC BOARD	ATT SHIELD (1)
E	7	1	4G400529	P8915A PC BOARD	ATT SHIELD (2)
E	8	1	4G400529	P8915A PC BOARD	ATT SHIELD (2)
E	9	1	4G400529	P8915A PC BOARD	ATT SHIELD (2)
E	10	1	4G400529	P8915A PC BOARD	ATT SHIELD (2)
E	11	1	4G400529	P8915A PC BOARD	ATT SHIELD (2)
FL	1	1	ZFN5203A	FL:FEED-THRU	
FL	2	1	ZFN5203A	FL:FEED-THRU	
FL	3	1	ZFN5103A	FL:FEED-THRU	
FL	4	1	ZFN5203A	FL:FEED-THRU	
FL	5	1	ZFN5103A	FL:FEED-THRU	
FL	6	1	ZFN5103A	FL:FEED-THRU	
FL	7	1	ZFN5103A	FL:FEED-THRU	
FL	8	1	ZFN5103A	FL:FEED-THRU	
FL	11	1	ZFN5103A	FL:FEED-THRU	
FL	12	1	ZFN5103A	FL:FEED-THRU	
FL	13	1	ZFN5103A	FL:FEED-THRU	
FL	14	1	ZFN5203A	FL:FEED-THRU	
FL	15	1	ZFN5203A	FL:FEED-THRU	
FL	21	1	ZFN5203A	FL:FEED-THRU	
FL	22	1	ZFN5203A	FL:FEED-THRU	
FL	23	1	ZFN5203A	FL:FEED-THRU	
FL	24	1	ZFN5203A	FL:FEED-THRU	
FL	25	1	ZFN5203A	FL:FEED-THRU	
FL	26	1	ZFN5203A	FL:FEED-THRU	
FL	27	1	ZFN5203A	FL:FEED-THRU	
FL	28	1	ZFN5203A	FL:FEED-THRU	
J	1	1	UMRPC	CONNECTOR:COAX	RECEPT
J	2	1	UMRPC	CONNECTOR:COAX	RECEPT
J	3	1	UMLRPC	CONNECTOR:COAX	RECEPT
J	4	1	UMLRPC	CONNECTOR:COAX	RECEPT
J	5	1	77J01	Q075A84 CONNECTOR	BNC PANEL JACK
L	1	1	4G431249	P8915A COIL	OSC
L	2	1	4G431250-1	P8915A COIL	OSC
L	6	1	3L0004	FERRITE CORE	
L	10	1	4G431251-1	P8915A COIL	LPF
L	11	1	4G430701-1	P864A COIL:CHOKE	SWEEP

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REF	NO	QTY	PART NO	DESCRIPTION	
L	12	1	4G430701-1	P864A COIL:CHOKE	SWEEP
L	15	1	4G431251-1	P8915A COIL	LPF
L	16	1	3L0004	FERRITE CORE	
L	17	1	3L0004	FERRITE CORE	
P	1	1	UMQLP1-5	CONNECTOR:COAX	PLUG
P	2	1	UMQLP1-5	CONNECTOR:COAX	PLUG
P	3	1	M3110S13	CONNECTOR:PIN	10P L:300
P	4	1	UMQLP1-5	CONNECTOR:COAX	PLUG
Q	1	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q	2	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q	3	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q	4	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q	5	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q	6	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q	7	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q	8	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q	9	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q	15	1	2SC1215	TSTR:SI NPN	PC:200MW FT:1200MHZ
Q	16	1	2SC1215	TSTR:SI NPN	PC:200MW FT:1200MHZ
Q	17	1	2SC2671-HH	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	*17	1	2SC2671-H#	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	18	1	2SC2671-HH	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	*18	1	2SC2671-H#	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	19	1	2SC2671-HH	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	*19	1	2SC2671-H#	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	20	1	2SC2671-HH	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	*20	1	2SC2671-H#	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	21	1	2SC2671-HH	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	*21	1	2SC2671-H#	TSTR:SI NPN	PC:250MW FT:2500MHZ
Q	22	1	2SC1252	TSTR:SI NPN	PC:800MW FT:1700MHZ
Q	23	1	2SC1252	TSTR:SI NPN	PC:800MW FT:1700MHZ
Q	30	1	2SC1215	TSTR:SI NPN	PC:200MW FT:1200MHZ
Q	31	1	2SC1215	TSTR:SI NPN	PC:200MW FT:1200MHZ
Q	32	1	2SC1260	TSTR:SI NPN	PC:250MW FT:2000MHZ
Q	35	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
R	1	1	ERO25CKF97R6	R:FXD MET FLM	97.6 OHM 1% 1/4W
R	2	1	ERO25CKF10R2	R:FXD MET FLM	10.2 OHM 1% 1/4W
R	3	1	ERO25CKF11R5	R:FXD MET FLM	11.5 OHM 1% 1/4W
R	4	1	ERO25CKF2430	R:FXD MET FLM	243 OHM 1% 1/4W
R	5	1	ERO25CKF11R5	R:FXD MET FLM	11.5 OHM 1% 1/4W

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REF NO	QTY	PART NO	DESCRIPTION	
R 6	1	ERO25CKF25R5	R:FXD MET FLM	25.5 OHM 1% 1/4W
R 7	1	ERO25CKF3400	R:FXD MET FLM	340 OHM 1% 1/4W
R 8	1	ERO25CKF12R7	R:FXD MET FLM	12.7 OHM 1% 1/4W
R 9	1	ERO25CKF37R4	R:FXD MET FLM	37.4 OHM 1% 1/4W
R 10	1	ERO25CKF1370	R:FXD MET FLM	137 OHM 1% 1/4W
R 11	1	ERO25CKF22R1	R:FXD MET FLM	22.1 OHM 1% 1/4W
R 12	1	ERO25CKF68R1	R:FXD MET FLM	68.1 OHM 1% 1/4W
R 13	1	ERO25CKF1001	R:FXD MET FLM	1K OHM 1% 1/4W
R 14	1	ERO25CKF5620	R:FXD MET FLM	562 OHM 1% 1/4W
R 15	1	ERO25CKF1001	R:FXD MET FLM	1K OHM 1% 1/4W
R 16	1	ERO25CKF5620	R:FXD MET FLM	562 OHM 1% 1/4W
R 17	1	ERO25CKF1001	R:FXD MET FLM	1K OHM 1% 1/4W
R 18	1	ERO25CKF5620	R:FXD MET FLM	562 OHM 1% 1/4W
R 19	1	ERO25CKF1001	R:FXD MET FLM	1K OHM 1% 1/4W
R 20	1	ERO25CKF5620	R:FXD MET FLM	562 OHM 1% 1/4W
R 21	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W
R 22	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W
R 23	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 24	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 25	1	ERD25TJ183V	R:FXD CARBON	18K OHM 5% 1/4W
R 26	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 27	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W
R 28	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W
R 29	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W
R 30	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 31	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 32	1	ERD25TJ183V	R:FXD CARBON	18K OHM 5% 1/4W
R 33	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 34	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W
R 35	1	ERD25TJ682V	R:FXD CARBON	6.8K OHM 5% 1/4W
R 36	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W
R 37	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 38	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 39	1	ERD25TJ183V	R:FXD CARBON	18K OHM 5% 1/4W
R 40	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 41	1	ERD25TJ221V	R:FXD CARBON	220 OHM 5% 1/4W
R 50	1	ERO25CKF56R2	R:FXD MET FLM	56.2 OHM 1% 1/4W
R 51	1	ERO25CKF10R2	R:FXD MET FLM	10.2 OHM 1% 1/4W
R 52	1	ERD25TJ272V	R:FXD CARBON	2.7K OHM 5% 1/4W
R 53	1	ERD25TJ101V	R:FXD CARBON	100 OHM 5% 1/4W
R 54	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W
R 55	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 56	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 57	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
R 58	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W

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REF NO	QTY	PART NO	DESCRIPTION	
R 59	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 60	1	ERD25TJ181V	R:FXD CARBON	180 OHM 5% 1/4W
R 61	1	ERD10TJ270	R:FXD CARBON	27 OHM 5% 1/8W
R 62	1	ERD10TJ330	R:FXD CARBON	33 OHM 5% 1/8W
R 63	1	ERD10TJ220	R:FXD CARBON	22 OHM 5% 1/8W
R 64	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 65	1	ERD25TJ220V	R:FXD CARBON	22 OHM 5% 1/4W
R 66	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 67	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 68	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 69	1	ERD25TJ151V	R:FXD CARBON	150 OHM 5% 1/4W
R 70	1	ERD25TJ220V	R:FXD CARBON	22 OHM 5% 1/4W
R 71	1	ERD10TJ390	R:FXD CARBON	39 OHM 5% 1/8W
R 72	1	ERD10TJ100	R:FXD CARBON	10 OHM 5% 1/8W
R 73	1	ERD25TJ821V	R:FXD CARBON	820 OHM 5% 1/4W
R 74	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 75	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 76	1	ERD25TJ151V	R:FXD CARBON	150 OHM 5% 1/4W
R 77	1	ERD25TJ330V	R:FXD CARBON	33 OHM 5% 1/4W
R 78	1	ERD10TJ470	R:FXD CARBON	47 OHM 5% 1/8W
R 79	1	ERD10TJ220	R:FXD CARBON	22 OHM 5% 1/8W
R 80	1	ERD25TJ331V	R:FXD CARBON	330 OHM 5% 1/4W
R 81	1	ERD25TJ680V	R:FXD CARBON	68 OHM 5% 1/4W
R 82	1	ERO25CKF1101	R:FXD MET FLM	1.10K OHM 1% 1/4W
R 83	1	ERO25CKF1101	R:FXD MET FLM	1.10K OHM 1% 1/4W
R 84	1	ERD25TJ181V	R:FXD CARBON	180 OHM 5% 1/4W
R 85	1	ERD25TJ121V	R:FXD CARBON	120 OHM 5% 1/4W
R 86	1	ERD25TJ560V	R:FXD CARBON	56 OHM 5% 1/4W
R 87	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W
R 88	1	ERO25CKF1101	R:FXD MET FLM	1.10K OHM 1% 1/4W
R 89	1	ERO25CKF1101	R:FXD MET FLM	1.10K OHM 1% 1/4W
R 90	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 90	1	ERD25TJ392V	R:FXD CARBON	3.9K OHM 5% 1/4W
R 91	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 91	1	ERD25TJ392V	R:FXD CARBON	3.9K OHM 5% 1/4W
R 92	1	ERD10TJ330	R:FXD CARBON	33 OHM 5% 1/8W
R 93	1	ERD10TJ330	R:FXD CARBON	33 OHM 5% 1/8W
R 94	1	ERD10TJ330	R:FXD CARBON	33 OHM 5% 1/8W
R 95	1	ERO25CKF1500	R:FXD MET FLM	150 OHM 1% 1/4W
R 96	1	ERO25CKF1500	R:FXD MET FLM	150 OHM 1% 1/4W
R 97	1	ERO25CKF37R4	R:FXD MET FLM	37.4 OHM 1% 1/4W
R 98	1	ERO25CKF37R4	R:FXD MET FLM	37.4 OHM 1% 1/4W
R 99	1	ERO25CKF1500	R:FXD MET FLM	150 OHM 1% 1/4W
R 100	1	ERO25CKF1500	R:FXD MET FLM	150 OHM 1% 1/4W
R 101	1	ERO25CKF2940	R:FXD MET FLM	294 OHM 1% 1/4W

VTO DWG NO 4G203364

REF NO	QTY	PART NO	DESCRIPTION	
R 102	1	ERO25CKF2940	R:FXD MET FLM	294 OHM 1% 1/4W
R 103	1	ERO25CKF2940	R:FXD MET FLM	294 OHM 1% 1/4W
R 104	1	ERO25CKF2940	R:FXD MET FLM	294 OHM 1% 1/4W
R 105	1	ERD10TJ100	R:FXD CARBON	10 OHM 5% 1/8W
R 106	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 107	1	ERO25CKF17R4	R:FXD MET FLM	17.4 OHM 1% 1/4W
R 108	1	ERO25CKF17R4	R:FXD MET FLM	17.4 OHM 1% 1/4W
R 111	1	ERO25CKF1781	R:FXD MET FLM	1.78K OHM 1% 1/4W
R 112	1	ERD10TJ220	R:FXD CARBON	22 OHM 5% 1/8W
R 113	1	ERD25TJ101V	R:FXD CARBON	100 OHM 5% 1/4W
R 114	1	ERD10TJ100	R:FXD CARBON	10 OHM 5% 1/8W
R 120	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 121	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 122	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 124	1	ERD25TJ392V	R:FXD CARBON	3.9K OHM 5% 1/4W
R 125	1	ERD25TJ474V	R:FXD CARBON	470K OHM 5% 1/4W
R 126	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 127	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W
R 128	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 129	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W
R 130	1	ERD25TJ821V	R:FXD CARBON	820 OHM 5% 1/4W
R 131	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 132	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
U 1	1	UPC157C	IC:OP AMP	

MKR-1-C DWG NO 4G203365

REF NO	QTY	PART NO	DESCRIPTION	
C 1	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
C 2	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
C 3	1	ECKW1H103ZF5	C:FXD CER HI-K	10000PF +80-20% 50V
C 4	1	ECKW1H103ZF5	C:FXD CER HI-K	10000PF +80-20% 50V
C 5	1	ECKW1H103ZF5	C:FXD CER HI-K	10000PF +80-20% 50V
C 6	1	ECKW1H103ZF5	C:FXD CER HI-K	10000PF +80-20% 50V
C 7	1	ECKW1H103ZF5	C:FXD CER HI-K	10000PF +80-20% 50V
C 8	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 14	1	ECQM1H104KZ	C:FXD FLM	0.1UF 10% 50V
C 16	1	ECQM1H473KZ	C:FXD FLM	0.047UF 10% 50V
C 17	1	ECQM1H104KZ	C:FXD FLM	0.1UF 10% 50V
C 18	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
C 19	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
C 20	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
C 21	1	ECEA1AS101	C:FXD AL ELECT	100UF +-20% 10V
C 22	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 23	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 24	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 25	1	ECEA1CS101	C:FXD AL ELECT	100UF +-20% 16V
C 26	1	ECEA1CS101	C:FXD AL ELECT	100UF +-20% 16V
C 27	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 28	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 29	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 30	1	ECEA1AS101	C:FXD AL ELECT	100UF +-20% 10V
C 31	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 32	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C 48	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
CR 1	1	MA150TA	DIODE:SI	100MA 35V
CR 2	1	MA150TA	DIODE:SI	100MA 35V
CR 3	1	MA150TA	DIODE:SI	100MA 35V
CR 4	1	MA150TA	DIODE:SI	100MA 35V
CR 5	1	MA150TA	DIODE:SI	100MA 35V
CR 6	1	MA150TA	DIODE:SI	100MA 35V
CR 7	1	MA150TA	DIODE:SI	100MA 35V
CR 8	1	MA150TA	DIODE:SI	100MA 35V
CR 9	1	MA150TA	DIODE:SI	100MA 35V
CR 10	1	MA150TA	DIODE:SI	100MA 35V
CR 16	1	MA150TA	DIODE:SI	100MA 35V
CR 19	1	MA150TA	DIODE:SI	100MA 35V
E 1	1	3G400945	P8915A PC BOARD A11	MARKER (1)
J 1	1	M3110S40	CONNECTOR:PIN	10P
J 2	1	M3115S40	CONNECTOR:PIN	15P

MKR-1-C DWG NO 4G203365

REF NO	QTY	PART NO	DESCRIPTION	
Q 1	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 2	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 3	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 4	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 5	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
Q 6	1	2SA564A-RS	TSTR:SI PNP	PC:250MW FT:80MHZ
Q 7	1	2SC828A-RS	TSTR:SI NPN	PC:250MW FT:220MHZ
R 6	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 7	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 8	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 9	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 10	1	ERD25TJ123V	R:FXD CARBON	12K OHM 5% 1/4W
R 11	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 12	1	ERD25TJ332V	R:FXD CARBON	3.3K OHM 5% 1/4W
R 13	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 14	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 15	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 16	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 17	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 18	1	ERD25TJ243V	R:FXD CARBON	24K OHM 5% 1/4W
R 19	1	ERD25TJ243V	R:FXD CARBON	24K OHM 5% 1/4W
R 20	1	ERD25TJ243V	R:FXD CARBON	24K OHM 5% 1/4W
R 21	1	ERD25TJ243V	R:FXD CARBON	24K OHM 5% 1/4W
R 22	1	ERD25TJ243V	R:FXD CARBON	24K OHM 5% 1/4W
R 23	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 24	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 25	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 26	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 27	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 28	1	ERD25TJ822V	R:FXD CARBON	8.2K OHM 5% 1/4W
R 29	1	ERD25TJ153V	R:FXD CARBON	15K OHM 5% 1/4W
R 30	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 31	1	ERD25TJ333V	R:FXD CARBON	33K OHM 5% 1/4W
R 32	1	ERD25TJ393V	R:FXD CARBON	39K OHM 5% 1/4W
R 36	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
R 37	1	ERD25TJ222V	R:FXD CARBON	2.2K OHM 5% 1/4W
R 38	1	ERD25TJ223V	R:FXD CARBON	22K OHM 5% 1/4W
R 42	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 43	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 44	1	ERD25TJ104V	R:FXD CARBON	100K OHM 5% 1/4W
R 45	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R 50	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W

MKR-1-C DWG NO 4G203365

REF	NO	QTY	PART NO	DESCRIPTION	
U	1	1	SN74LS93N	IC:TTL LS	4-BIT BINARY COUNTER
U	2	1	SN74LS42AN	IC:TTL LS	BCD-DECIMAL DECODER
U	3	1	SN74LS04N	IC:TTL LS	HEX INVERTER
U	4	1	SN74LS08N	IC:TTL LS	QUAD 2-INPUT AND GATE
U	11	1	UPC271C	IC:COMPARATOR	
U	12	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE
U	13	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE
U	14	1	SN74LS08N	IC:TTL LS	QUAD 2-INPUT AND GATE
U	15	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE
U	21	1	UPC451C	IC:OP AMP	QUAD
U	22	1	UPC451C	IC:OP AMP	QUAD
VR	11	1	RD13EB3	DIODE:ZENER	13.2V 500MW
VR	12	1	RD13EB3	DIODE:ZENER	13.2V 500MW
VR	13	1	RD13EB3	DIODE:ZENER	13.2V 500MW
VR	14	1	RD13EB3	DIODE:ZENER	13.2V 500MW
VR	15	1	RD13EB3	DIODE:ZENER	13.2V 500MW

MKR-1-E DWG NO 4G203366

REF	NO	QTY	PART NO	DESCRIPTION	
C	9	1	ECSF25E4R7G	C:FXD TA ELECT	4.7UF 20% 25V
C	10	1	ECSF25E4R7G	C:FXD TA ELECT	4.7UF 20% 25V
C	11	1	ECSF25E2R2G	C:FXD TA ELECT	2.2UF 20% 25V
C	12	1	ECSF25E2R2G	C:FXD TA ELECT	2.2UF 20% 25V
C	13	1	ECSF25E2R2G	C:FXD TA ELECT	2.2UF 20% 25V
C	33	1	ECKW1H102KB5	C:FXD CER HI-K	1000PF +-10% 50V
P	3	1	M3110S13	CONNECTOR:PIN	10P L:300
R	1	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W
R	2	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W
R	3	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W
R	4	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W
R	5	1	ERD25TJ470V	R:FXD CARBON	47 OHM 5% 1/4W
R	39	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W

MKR-2 DWG NO 4G203367

REF	NO	QTY	PART NO	DESCRIPTION	
C	1	1	ECCF1H101KC	C:FXD CER TC	100PF +-10% 50V NPO
C	2	1	ECKW1H103ZF5	C:FXD CER HI-K	10000PF +80-20% 50V
C	3	1	ECKW1H103ZF5	C:FXD CER HI-K	10000PF +80-20% 50V
C	4	1	ECCF1H470KC	C:FXD CER TC	47PF +-10% 50V NPO
C	5	1	ECKW1H221KB5	C:FXD CER HI-K	220PF +-10% 50V
C	6	1	ECCW1H220KC5	C:FXD CER TC	22PF +-10% 50V NPO
C	7	1	ECKW1H221KB5	C:FXD CER HI-K	220PF +-10% 50V
C	8	1	ECCW1H330KC5	C:FXD CER TC	33PF +-10% 50V NPO
C	11	1	ECKF1H104ZV	C:FXD CER HI-K	0.1UF +80%-20% 50V
C	12	1	ECKF1H104ZV	C:FXD CER HI-K	0.1UF +80%-20% 50V
C	13	1	ECKF1H104ZV	C:FXD CER HI-K	0.1UF +80%-20% 50V
C	14	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C	15	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C	16	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C	17	1	ECKF1H473ZF	C:FXD CER HI-K	47000PF +80-20% 50V
C	18	1	ECEB1AS101	C:FXD AL ELECT	100UF +-20% 10V
C	19	1	ECEB1AS101	C:FXD AL ELECT	100UF +-20% 10V
C	20	1	ECEB1AS101	C:FXD AL ELECT	100UF +-20% 10V
C	21	1	ECKF1H331KB	C:FXD CER HI-K	330PF +-10% 50V
C	25	1	ECCF1H390K	C:FXD CER TC	39PF +-10% 50V SL
E	1	1	3G400946	P8915A PC BOARD A11	MARKER (2)
P	1	1	M3310P01	CONNECTOR:PIN	10P STRAIGHT
P	2	1	M3115P01	CONNECTOR:PIN	15P
P	3	1	M3115S13	CONNECTOR:PIN	15P L:300
P	4	1	M3110S13	CONNECTOR:PIN	10P L:300
P	5	1	UMQLP1-5	CONNECTOR:COAX	PLUG
Q	1	1	2SC1215	TSTR:SI NPN	PC:200MW FT:1200MHZ
R	1	1	ERD25TJ560V	R:FXD CARBON	56 OHM 5% 1/4W
R	2	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R	3	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W
R	4	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W
R	5	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W
R	6	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W
R	7	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W
R	8	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W
R	9	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W
R	10	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W
R	11	1	ERD25TJ561V	R:FXD CARBON	560 OHM 5% 1/4W
R	12	1	ERD25TJ821V	R:FXD CARBON	820 OHM 5% 1/4W
R	15	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W
R	16	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W
R	17	1	ERD25TJ102V	R:FXD CARBON	1K OHM 5% 1/4W

MKR-2 DWG NO 4G203367

REF	NO	QTY	PART NO	DESCRIPTION	
R	18	1	ERD25TJ152V	R:FXD CARBON	1.5K OHM 5% 1/4W
R	19	1	ERD25TJ152V	R:FXD CARBON	1.5K OHM 5% 1/4W
R	21	1	ERO25CKF1371	R:FXD MET FLM	1.37K OHM 1% 1/4W
R	22	1	ERD25TJ272V	R:FXD CARBON	2.7K OHM 5% 1/4W
U	1	1	HD10231	IC:ECL	DUAL D MASTER-SLAVE F-F
U	2	1	SN74S112N	IC:TTL S	DUAL J-K FLIP-FLOP
U	3	1	SN74LS192N	IC:TTL LS	REVERS DECADE COUNTER
U	4	1	SN74LS192N	IC:TTL LS	REVERS DECADE COUNTER
U	5	1	SN74LS192N	IC:TTL LS	REVERS DECADE COUNTER
U	6	1	SN74LS192N	IC:TTL LS	REVERS DECADE COUNTER
U	7	1	SN74LS76N	IC:TTL LS	DUAL J-K FLIP-FLOP
U	8	1	SN74LS192N	IC:TTL LS	REVERS DECADE COUNTER
U	11	1	MC10216L	IC:ECL	TRIPLE LINE RECEIVER
U	12	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE
U	13	1	SN74LS93N	IC:TTL LS	4-BIT BINARY COUNTER
U	14	1	SN74LS90N	IC:TTL LS	DECADE COUNTER
U	15	1	SN74LS93N	IC:TTL LS	4-BIT BINARY COUNTER
U	16	1	SN74LS90N	IC:TTL LS	DECADE COUNTER
U	17	1	SN74LS00N	IC:TTL LS	QUAD 2-INPUT NAND GATE
Y	1	1	78A21	CRYSTAL:QUARTZ OSC	16MHZ (HC-18/U)

PANEL DWG NO 4G203368

REF	NO	QTY	PART NO	DESCRIPTION	
P	5	1	M3305S13	CONNECTOR:PIN	5P L:300
R	55	1	EVSN2AS15B15	R:VAR COMP	100K OHM 10% 1/2W
R	56	1	EVSN2AS15B55	R:VAR COMP	500K OHM 10% 1/2W

OVERALL DWG NO 4G203428

REF NO	QTY	PART NO	DESCRIPTION	
	1	78W05	P8920B CABLE ASSY	
	1	78W06	P8915J CABLE ASSY	
C 1	1	ECEB1VS470	C:FXD AL ELECT	47UF +-20% 35V
C 2	1	ECKD1E104ZFZ	C:FXD CER HI-K	100000PF +80-20% 25V
C 3	1	ECQM4104MZ	C:FXD FLM	0.1UF 20% 400V
CR 1	1	SF1	DIODE:SWITCHING	300MA 1500V
E 1	1	4G644260-0GB	TERMINAL:PROTECTIV EARTH	
E 2	1	CM2	CONNECTOR	POWER AC125V 15A
F **	1	TSC1A	FUSE	1A 250V 20MM
F 1	1	TSC1A	FUSE	1A 250V 20MM
J 1	1	UG625UNI	CONNECTOR:COAX	BNC PANEL JACK
L 1	1	0L002	COIL:FXD	
P 1	1	M3110S13	CONNECTOR:PIN	10P L:300
Q 1	1	2SB691-PQ	TSTR:GE PNP	PC:600MW FT:7MHZ
R 1	1	ERD25TJ681V	R:FXD CARBON	680 OHM 5% 1/4W
R 2	1	ERD25TJ103V	R:FXD CARBON	10K OHM 5% 1/4W
R 3	1	EVHZ03Z06B14	R:VAR CARBON	10K OHM 20% 1/5W
R 4	1	ERG2ANJ471	R:FXD MET OXD	470 OHM 5% 2W
R 5	1	ERD25TJ472V	R:FXD CARBON	4.7K OHM 5% 1/4W
S 1	1	ESB701T	PUSHB SW	DPDT 3A-250V AC
S 2	1	4G410473	P8811A ROTARY SW	ATT
T 1	1	3G430386-1	P8911A TRANSFORMER	PWR
T 2	1	74T004	P8920B TRANSFORMER	HV
V 1	1	230BLB4	CRT	9-INCH
W 1	1	77W02	CABLE:PWR (UL,CSA)	125V 10A
XF 1	1	SN2250	FUSE HOLDER	10A 250V
XV 1	1	TV801	CRT SOCKET	

MECHA-E DWG NO 4G301837

REF NO	QTY	PART NO	DESCRIPTION
	1	2G580544-0FA	P8913B PLATE,REAR
	1	2G580545-0W	P8913B PLATE,BOTTOM
	1	3G612404-0CB	P8911A HEAT SINK
	1	3G630851-1CH	P8915A SUBPANEL
	1	3G631019-0AH	P8913B PANEL
	2	4G540100-0HB	P5620A SPRING,SLIT
	1	4G550017-3N	P251A STAND
	2	4G601008-0W	P054V HOLDER ASSY D6
	2	4G614974-0PB	P251A NUT
	1	4G615662-1BB	P8915A BRACKET:VTO
	1	4G615669-1HB	P8915A CASE:OSC
	1	4G615670-0EB	P8915A COVER:OSC
	2	4G615841-3BB	P8291A HOLDER:LED
	2	4G615919-1BB	P8912A SUPPORTER
	1	4G633263-1W	P8915A LABEL:IDENT
	1	4G644126-0EB	P8915A METAL FIT:GND
	1	4G670016-0CB	P8915A CASE:UNIT
	2	4G760025-3G	P251A FOOT,RECTANGULAR
	4	4G760209-0G	FOOT D20

MECHA-C DWG NO 4G302221

REF NO	QTY	PART NO	DESCRIPTION
	1	A72G-74M001	FASTNER:CRT BAND
	1	A78P-76M006	P3830A VIEWING HOOD
	1	R76W-60743C	BAND:POWER CORD
	1	2G580547-0D	P8915A COVER,TOP
	1	2G590120-3FB	P8911A CHASSIS
	1	3G530014-4X	P383A DIAGRAM
	1	3G590144-0BB	P8911A FRAME
	1	3G660510-1AF	P8915A FRAME,FRONT
	1	3G760038-0C	KNOB,23F6A
	1	4G540024-0B	P385B SPRING
	2	4G540056-0F	P383A SPRING:FILTER
	1	4G550009-0E	HANDLE ASSEY,MIDDLE
	2	4G550020-0FF	P5250A HOLDER:HANDLE-M
	1	4G615562-0YB	P8811A COVER:TRANS
	1	4G615563-0AB	P8911A SUPPORT:TRANS
	2	4G615566-0AB	P8811A PLATE
	1	4G615569-0BB	P8911A PLATE:VR
	1	4G615570-0AB	P8911A HEATSINK
	1	4G615571-0BB	P8911A BRACKET
	1	4G616709-0LB	BAND,D6
	1	4G633026-0LB	P386A LABEL:CAUTION
	1	4G633436-0KA	P5510A LABEL:POWER
	1	4G633809-0KA	P9602A PLATE,LINI VOLT
	3	4G644152-3BB	STUD 3X5
	2	4G644162-1AB	SPACER 2.6X10
	1	4G670059-1CB	P8811A CASE:UNIT
	1	4G702233-2E	P8911A ROD POWER
	3	4G760123-0C	KNOB,12D3U
	2	4G760169-0X	P8911A CUSHIOH:TRANS
	1	4G760214-0C	KNOB,16N6A
	2	4G760223-0C	KNOB,16A6A

PACKAGE DWG NO 4G301838

REF NO	QTY	PART NO	DESCRIPTION
	1	3G710401-0N	BAG:PACKING
	1	380SJ1	KP-380 PACKING KIT
	1	4G712001-1N	BAG:ACCESSORY
	2	4G712045-0N	BAG,1B
	1	4G712170-0A	KP-380 CARTON BOX
	4	4G712171-0F	KP-380 CUSHION
	1	4G712176-0G	KP-380 CUSHION,FRONT
	1	MMP8915A-0	INSTRUCTION MANUAL

VP-8915A CIRCUIT DIAGRAMS

- OVERALL INTERCONNECTION (A1)
- MONITOR (A2)
- VHF VTO (A3)
- MARKER (1) (A4)
- MARKER (2) (A5)
- MATRIX (A6)

NOTES

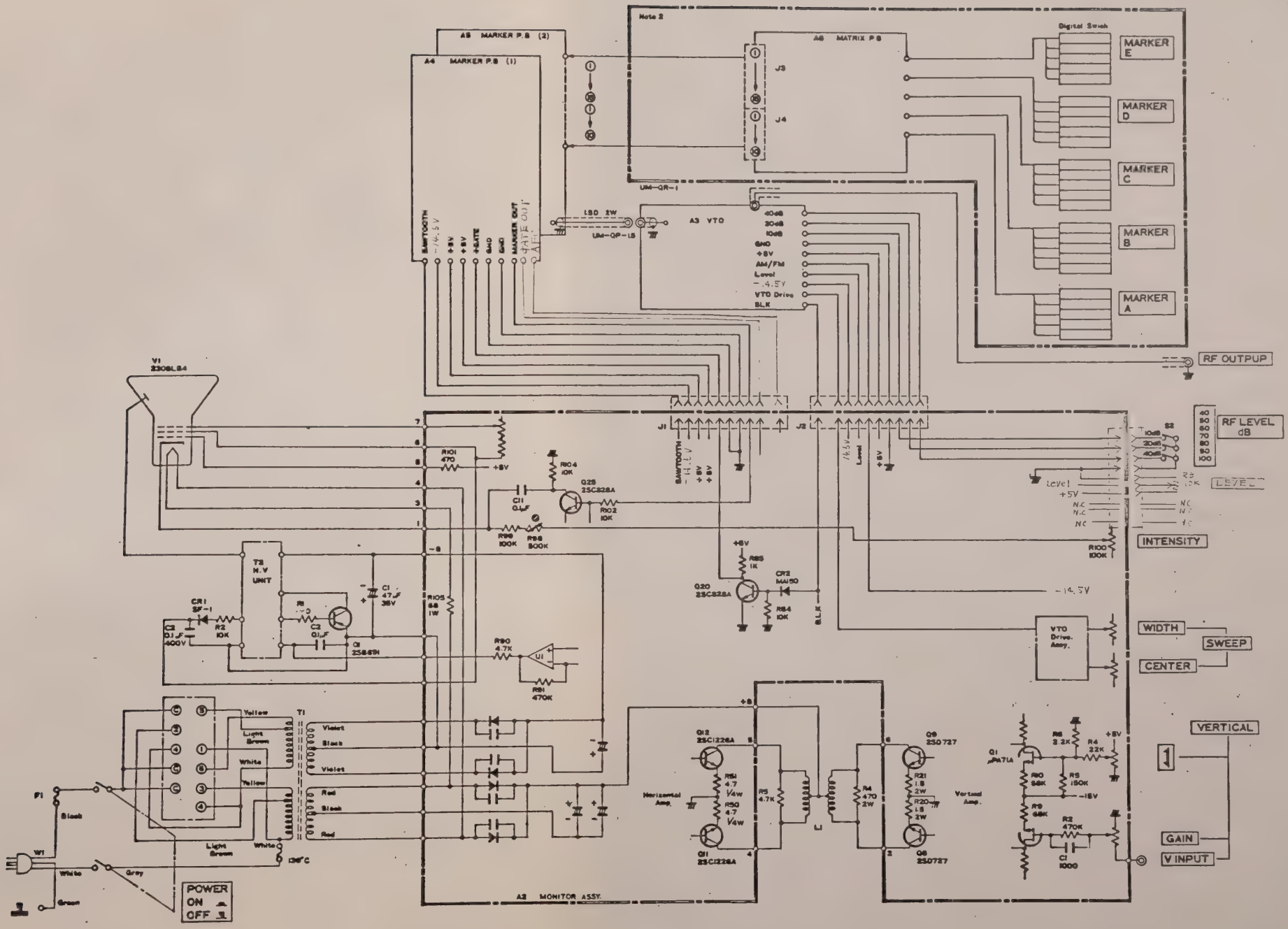
▷ WHEN THE CIRCUIT IS DIVIDED INTO SOME UNITS AND AN IDENTIFYING NUMBER IS ASSIGNED TO EACH UNIT, REFERENCE DESIGNATORS IN EACH CIRCUIT DIAGRAM ARE GIVEN IN ABBREVIATED FORM. PREFIX WITH EACH IDENTIFYING NUMBER FOR COMPLETE DESCRIPTION.
EXAMPLES; A1C1, A6R3.

▷ RESISTANCE VALUES IN OHMS AND CAPACITANCE IN PICOFARADS(FROM 1 TO 9,999) OR MICROFARADS (FROM 0.01 TO 0.99) UNLESS OTHERWISE NOTED.

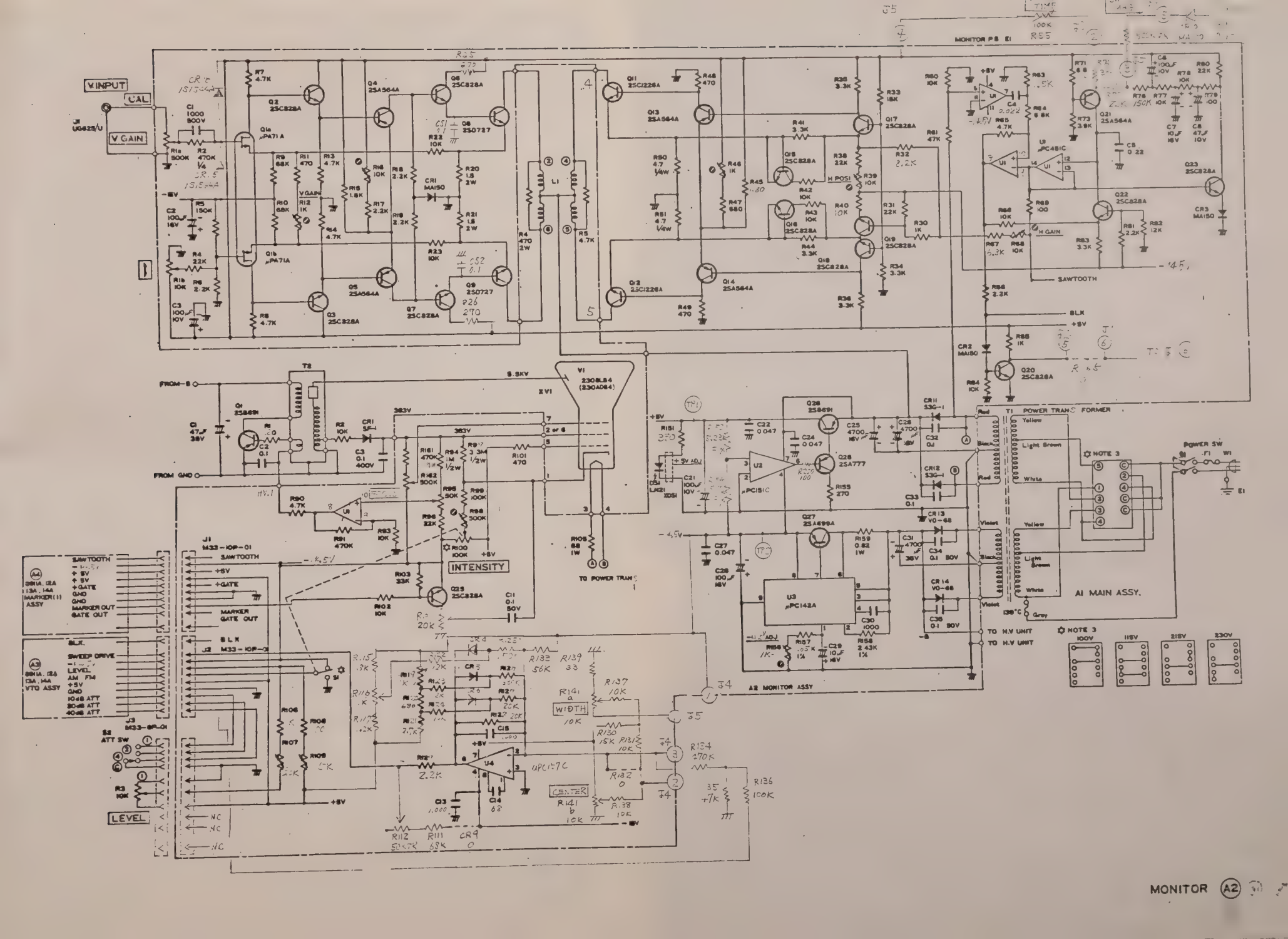
▷ POWER RATINGS AND RESISTANCE TOLERANCES OF FIXED RESISTORS ARE 1/8 WATTS AND ±5% UNLESS OTHERWISE NOTED.

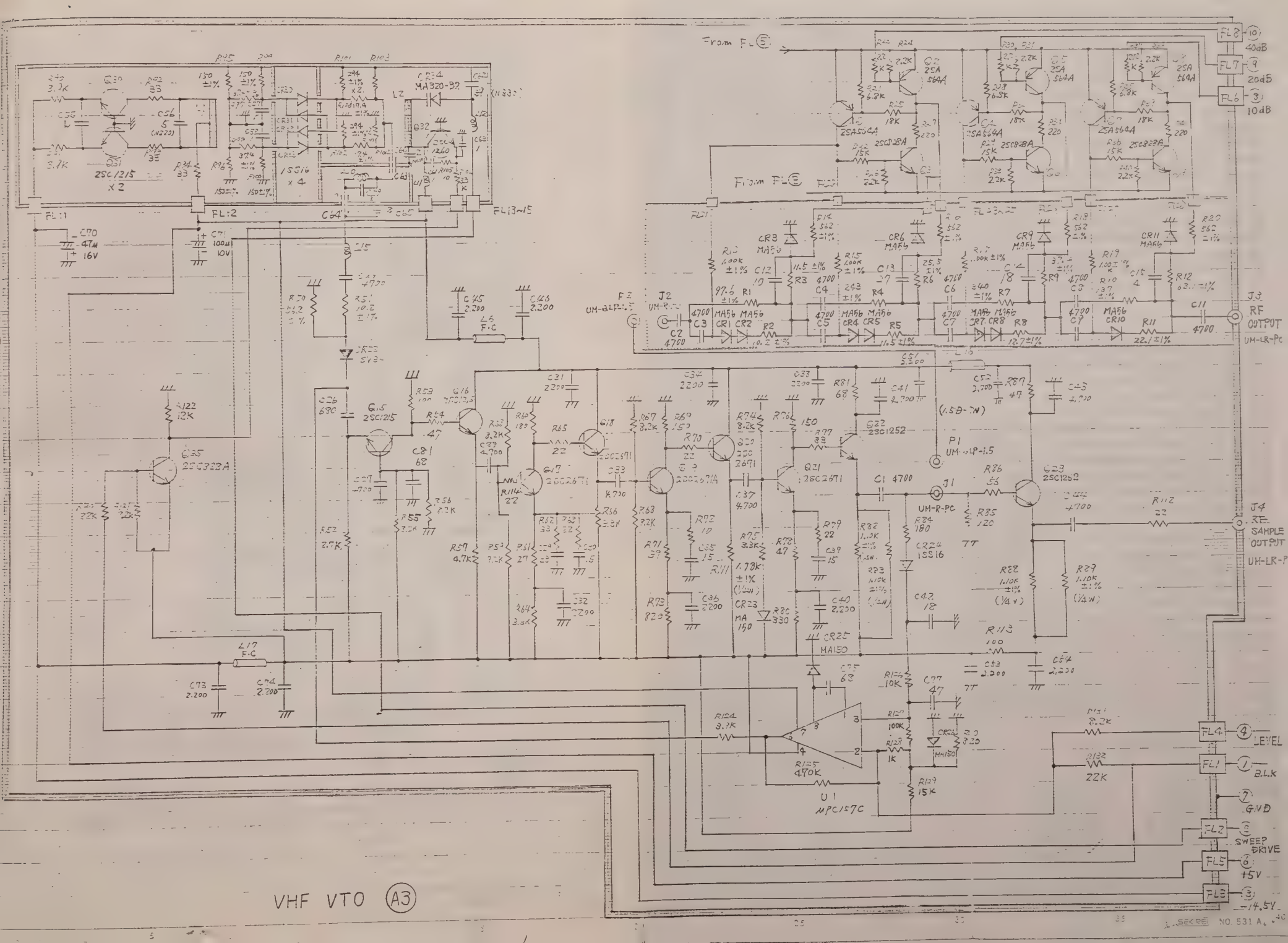
▷ ✡ FACTORY REWORKED OR CHECKED COMPONENTS.

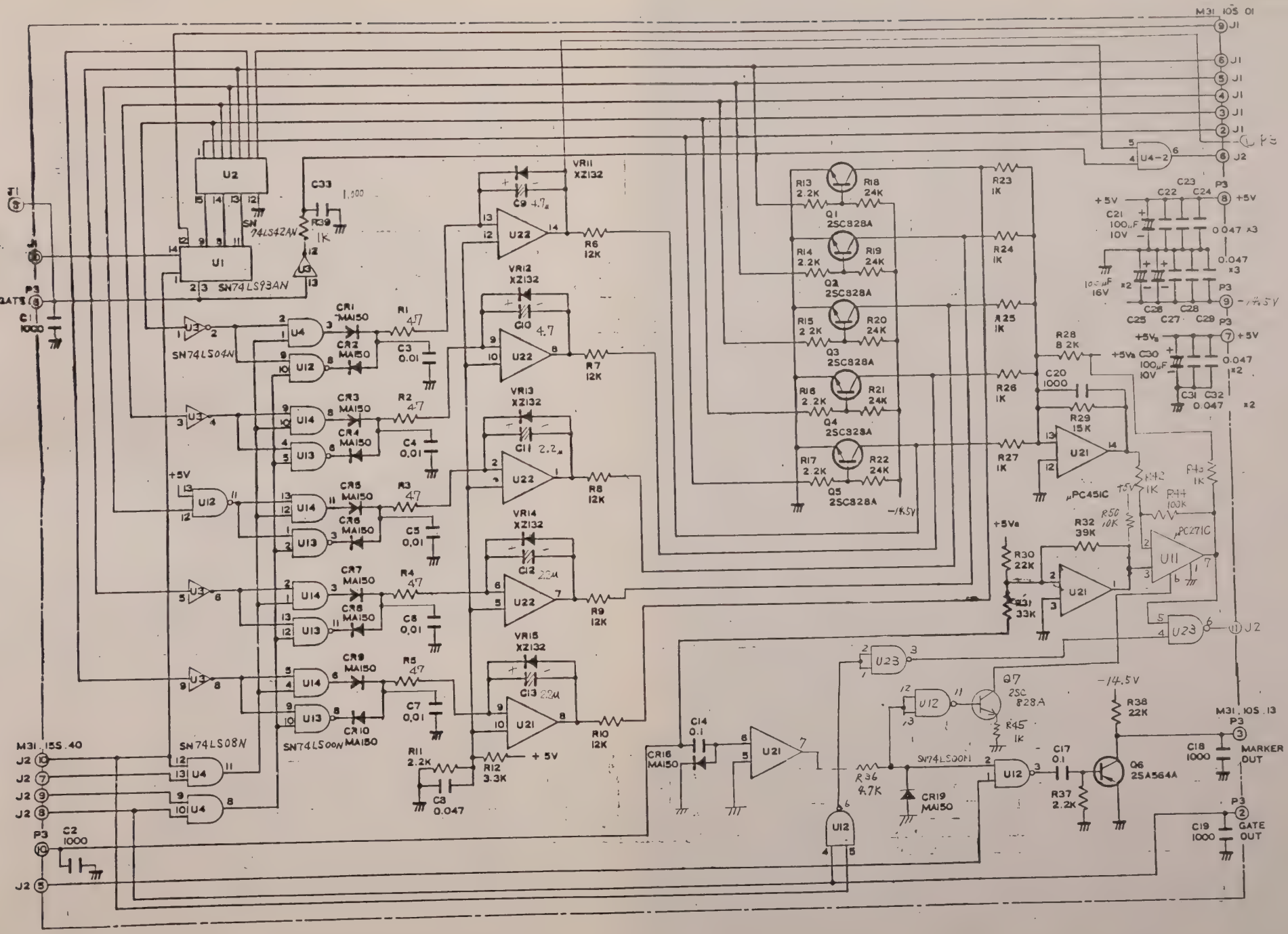
▷ ※ VALUE SELECTED AT FACTORY, NOMINAL VALUE SHOWN.

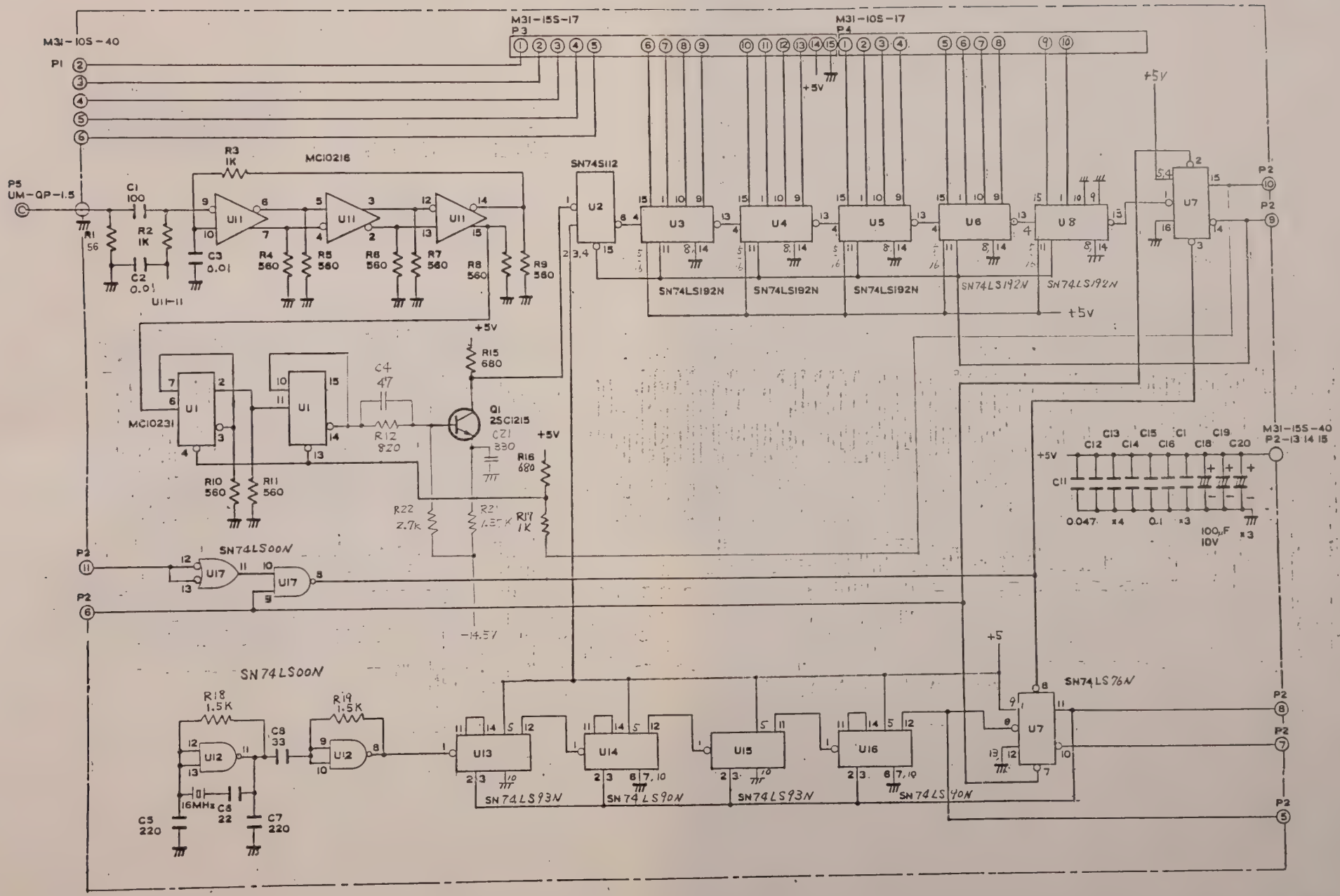


OVERALL INTERCONNECTION (A1)

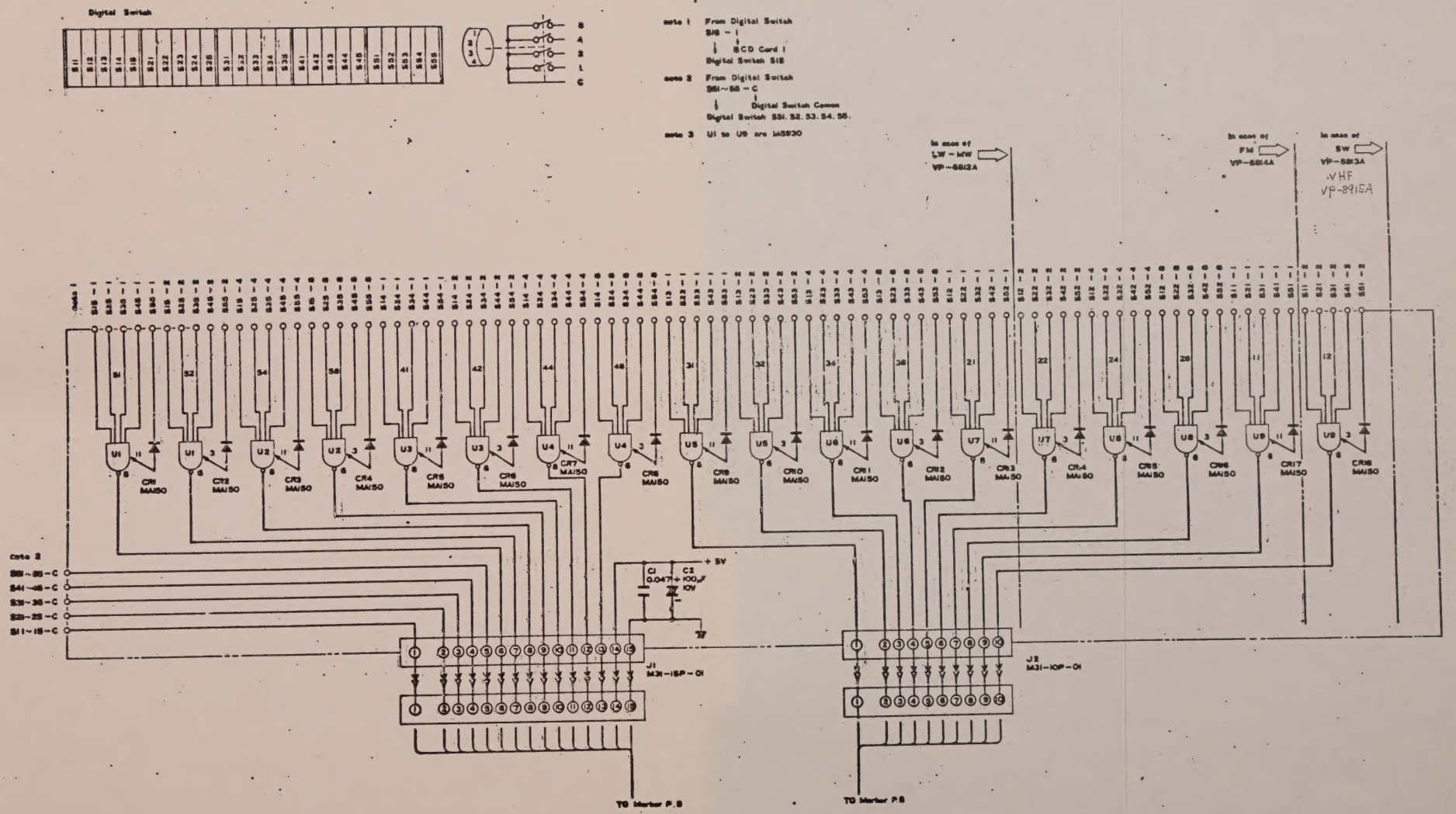

V INPUT
CAL
V GAIN
INTENSITY
LEVEL
SAWTOOTH
BLK
+8V
-8V
-4.5V
+5V
+GATE
MARKER OUT
GATE OUT
SWEEP DRIVE
LEVEL
AM FM
+5V
GND
10dB ATT
20dB ATT
40dB ATT
ATT SW
NC
TO POWER TRANS
TO H.V UNIT
TO H.V UNIT
A1 MAIN ASSY.
A2 MONITOR ASSY
MONITOR A2
T1 POWER TRANSFORMER
Power SW
Red
Yellow
Light Brown
White
Violet
Grey
Black
100V
115V
215V
230V
NOTE 3
SAWTOOTH
H GAIN
H POSI
V GAIN
WIDTH
CENTER
+5V ADJ
-4.5V ADJ
TIME
MONITOR PB E1


VHF VTO (A3)
From FL⑤
From FL⑤
FL1
FL2
FL3
FL4
FL5
FL6
FL7
FL8
FL9
FL10
FL11
FL12
FL13~15
40dB
20dB
10dB
RF OUTPUT
RE-SAMPLE OUTPUT
LEVEL
B.L.K
G.N.D
SWEEP DRIVE
+5V
-14.5V
J1
J2
J3
J4
P1
P2
U1
MPC157C
2SC1215 x2
1SS16 x4
2SA564A
2SC828A
2SC1252
2SC2671
MA320-32
MA56
MA150
SV3
UM-R-PC
UM-R-P
UM-BLP-1.5
VHF VTO (A3)
NO. 531 A


MARKER (1)



VHF MARKER (2) (A5)


Digital Switch
note 1 From Digital Switch SI8 – 1 → BCD Card 1 Digital Switch SI8
note 2 From Digital Switch SI1~S8 – C → Digital Switch Common Digital Switch SS1. S2. S3. S4. S5.
note 3 U1 to U9 are M5830
In case of LW – MW VP-8812A
In case of FM VP-8814A
In case of SW VP-8813A
VHF VP-8915A
note 2
SI1~S8 – C
S41~48 – C
S31~38 – C
S21~28 – C
S11~18 – C
C1 0.047μF
C2 100μF 10V
+ 5V
J1 M31-ISP-01
J2 M31-IOP-01
TO Marker P.B
TO Marker P.B